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### The Massachusetts Medical Society.

#### THE SHATTUCK LECTURE.\*

#### THE PHYSIOLOGICAL FACTORS CONCERNED IN SURGICAL SHOCK.

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Of the practical problems presented by clinical medicine, which are still baffling, one which is of unusual interest, from the physiological point of view, is that of surgical shock. It is of great practical significance; it is a condition of vital concern to individual human beings; it is mysterious in its onset and nature, and it presents a challenge as to the explanation of its nature which has been taken up by many investigators.

In the literature of surgical shock, complaint is often expressed that there is no clear definition of the condition. It seems to me that in such a complex as shock presents, definition is not a prime requisite. The important matter is to obtain a careful description of the facts of observation. Fortunately, we have such descriptions from competent clinical observers. The following is an abbreviation of an account

\* Read before the Massachusetts Medical Society, June 12, 1917, in the absence of Dr. Cannon, by Dr. David Cheever.

given by Fischer: "The patient, a strong and perfectly healthy young man, was struck in the abdomen by the pole of a carriage drawn by runaway horses. We have not been able, after careful examination, to find any trace of injury to any of the internal organs. Nevertheless, the grave symptoms and the alarming look which he still presents made their appearance immediately after the accident. He lies perfectly quiet and pays no attention whatever to events about him. The pupils are dilated and react slowly to light. He stares purposelessly and apathetically straight before him. His skin and such parts of the mucous membranes as are visible are as pale as marble, and his hands and lips have a bluish tinge. Large drops of sweat hang on his forehead and eyebrows, his whole body feels cold to the hand, and a thermometer indicates a degree and a half Centigrade in the axilla and a degree in the rectum, below the normal. Sensibility is much blunted over the whole body, and only when a very painful impression is made on the patient does he fretfully pull a wry face and make a languid defensive movement. If the limbs are lifted and then let go, they immediately fall as if dead. The urine is scanty and dense, but free from any traces of sugar and albumin. The pulse is almost imperceptible and very rapid. The arteries are small and the tension very low. The patient is conscious, but replies slowly and only when repeatedly and importunately questioned. On being thus questioned, he complains of cold, faintness, and deadness of the extremities. His respiration is characterized by long, deep, sighing inspirations, alternating with very super-

ficial ones, which are scarcely visible or audible. While being brought to the hospital he vomited several times, and nausea and hiccoughs still remain. His pallor, cold skin and hoarse voice, immediately recall the appearance of a cholera patient; characteristic dejections are alone wanting to make the resemblance complete." This description by Professor Fischer accords closely with the summary of the state of shock given by Sir W. Watson Cheyne: "The patient is usually found lying in a state of complete muscular relaxation, or if he makes any movements they are very irregular and feeble. The face is pale and drawn, the pupils dilated. There is sweating about the head, the reflexes are very slight, and there is diminished sensibility, but not absolute unconsciousness. The patient can answer questions when spoken to, but if not disturbed will generally lie in a semi-conscious condition. The respirations are feeble, irregular and sighing. The pulse is small, frequent and dierotic. At first the pulse rate is generally slowed; and increased frequency of the heart beat is regarded by some as a sign of the commencement of reaction. The skin is cold; the temperature subnormal."

These careful descriptions of the state of shock give clearly the main facts which have been made out by clinical observation; and the problem which is presented to the investigator is that of accounting for these facts. In unravelling any such complex, an effective procedure is that of endeavoring to analyze the phenomena into those which are primary and those which are secondary, or even tertiary, in their relations to the others. I propose that we take up the phenomena seen clinically in shock, and endeavor to determine what are the more essential features and what the less essential, and also the interplay between them.

The various signs and symptoms exhibited by a person in shock can be analyzed into four main groups. These are disturbances of sensation, of motion, of respiration, and of the functions and control of the circulation. The thirst which is present, the sweating, the lowered temperature, and the pupillary dilatation may be regarded as incidental. We can promote our inquiry as to which are the more fundamental and which the less fundamental of these disturbances if we inquire in each case regarding the part which the disturbance in question might play in accounting for other disturbances.

#### DISTURBANCES OF SENSATION.

All observers have noted that persons in shock have a diminished sensitiveness to stimulation. In the descriptions given above, the blunting of sensation, the apathy and the semi-consciousness were emphasized. What light can physiology throw on this condition of the organism?

In the first place, it is known that repeated stimulation of a given region or of a given group

of afferent nerves will produce a condition in which there is a lessened capacity of the nerves to transmit the impulses which the stimulation repeatedly starts. This fact was clearly established by Sherrington, who has determined that the ingoing impulses are, in all probability, blocked at the junction or synapse between the afferent nerve cells or neurones and neurones lying wholly within the central nervous system. The phenomenon of blocking is best accounted for as due to an increase of the natural resistance at the synapse to such a degree that the impulses fail to pass. It is obvious that the body as a whole would thus be protected against the effects of repeated stimulation along a given course. Sherrington's observations, to be sure, were made by stimulating a very limited field, and consequently there was a limited effect. There is evidence, however, that a condition similar to that observed by Sherrington can be produced much more diffusely by certain stimulations of the body. For example, Meltzer and Kast observed that exposure of the intestines caused a distinct reduction of the sensitiveness of the entire body, so that the animal became notably less responsive. A restlessness, previously existent, disappeared, and though the eyes were open and the lid reflex could be evoked, the animal was perfectly quiet and strikingly indifferent to stimulation. A strong stimulus applied to the skin would awake the animal, but it at once sank back into a lethargic condition. Meltzer interpreted these observations as due to inhibition, chiefly because under the conditions of his experiments the motions of the alimentary canal are inhibited; an effect, however, which is due to *activity* of the sympathetic system. It seems unnecessary to make a rather vague assumption of central inhibition, when increased synaptic thresholds would account for the phenomenon reasonably and in accordance with other observed physiological facts. The effect of manipulation of the intestines in reducing the sensitiveness of animals has been observed also by Janeway and Ewing, who report that continued manipulation will render an animal so insensitve as to permit the discontinuance of anesthesia. A general blocking of afferent pathways, best conceived as due to increased synaptic resistance, may, therefore, be invoked as an explanation for the blunted feelings of the victim of shock.

In the state of shock, as we have seen, the blood pressure is low. Further evidence that increased synaptic resistance may be present under such circumstances is found in some experiments made by one of my students, E. L. Porter, who studied the effect of low blood pressure on the minimal strength of a stimulus required to evoke a reflex in the spinal cord. He found that with a uniform elevation of arterial pressure the threshold stimulus for the reflex remained practically uniform. If then the blood pressure was lowered by bleeding, the threshold

promptly rose to a higher level, so that a considerably greater strength of stimulation was required in order to call the reflex forth. Thus, in one instance, the minimal stimulus rose from less than 40 units to over 110 units, solely as a consequence of the diminished blood supply. In all probability this effect is due to the influence of lack of oxygen or increase of carbon dioxide, for Porter found that either of these conditions had the effect of raising the threshold. If, after hemorrhage, the blood supply is restored, or if in the absence of oxygen, oxygen is again given, or if, after an increase of carbon dioxide that gas is diminished, the threshold of the reflex response returns to the former level with a fair degree of promptness. The time during which the nerve cells of the central nervous system will withstand a diminished blood supply without undergoing changes from which they cannot recover, needs further investigation. As Stewart and his co-workers have shown, however, these cells may endure total anemia for many minutes and still recover their capacity to function. But the anemia may produce definite dissociations of the neurones, so that when the blood supply is renewed they may not completely recover their ability to transmit impulses from one to another. Thus after total anemia, reflexes may again be active, but, whereas they were formerly bilateral, they are now only unilateral.

All this evidence taken together indicates that severe injury, especially injury of the abdominal region, and also a low arterial pressure, are capable of producing changes in the central nervous system which we can reasonably interpret, on the basis of present physiological concepts, as due to increased synaptic resistance, and which would fully account for the apathy and insensitivity of the shocked individual.

#### DISTURBANCES OF MOTION.

Bodily movements require the discharge of nerve impulses through neurones of the central nervous system out into muscles. There is no evidence that I am aware of that ingoing sensory impulses alone will disturb the synapses of the outward leading motor path. Sherrington found that after repeated stimulation had established a block in the stimulated afferent path and consequently had caused failure of the reflex, transference of the stimulus to a new afferent path would bring forth the reflex with its original vigor. The motor mechanisms, therefore, appear to be less affected than the sensory, by recurrent stimulations. On the other hand, a low arterial pressure may result in such an inadequate supply of blood that muscles become ineffective; and in all probability the nerve cells innervating the muscles and likewise the synapses, that intervene between nerve cells, may, as a consequence of relative anemia, suffer impairment of function. The evidence for this statement comes from observations made in the

Harvard Physiological Laboratory by C. M. Gruber, who studied the effect of low arterial pressures on the functions of muscles. He found that as the pressure is lowered, there is practically no effect until approximately 90 mm. of systolic pressure is reached. That seems to be a critical point. And if the pressure is reduced below that height, the muscle as a contracting organ becomes definitely less capable of doing work.

The mechanism for production of bodily heat when the temperature tends to fall involves reflex shivering and greater muscular activity. The fall of temperature in the shocked individual, therefore, may be regarded as a phenomenon secondary to the reduction of reflex responsiveness and to the muscular flaccidity.

The general relaxation of the individual in shock, his irregular and feeble movements, the slowing and weakening of central nervous functions, are all indicative of an increased resistance at the synapses or of a diminished capacity to function on the part of nerve cells or muscles, a change which, as indicated above, can reasonably be assumed to be secondary to their impaired nutrition.

#### DISTURBANCES OF RESPIRATION.

The respiration of a patient in the state of shock is of the typical superficial, rapid type seen in certain toxemias, and especially after severe hemorrhage. The patient breathes with extreme rapidity, with occasional deep sighs or gasps to break the rapid flutter. Yandell Henderson has suggested that respiration is a primary factor in shock, indeed that pain gives rise to such extremes of pulmonary ventilation as to diminish the carbon dioxide content of the blood, and thus to produce an acapnia to which he ascribes the circulatory phenomena of the shocked case. Considerable doubt is thrown upon Henderson's claims by the character of the respiration actually seen in shock. Only deep and vigorous ventilation of the lungs, very different from that of shock, results in a marked diminution of the carbon dioxide content of the blood. As Edsall has pointed out, with superficial respiration the gaseous exchange occurs more and more in the "dead space"—in the nostrils, trachea and bronchi—just in so far as the respiration becomes less and less deep. The effect, therefore, of continued shallow respiration would be to increase rather than to diminish the carbon dioxide content. Furthermore, Short has investigated the carbon dioxide factor in cases of shock and has found that the quantity in the venous blood is not reduced. Henderson's claim was that he succeeded in producing shock in animals by vigorous ventilation of the lungs, but in all probability the effect was due, not to reducing the carbon dioxide of the body, but to mechanically obstructing the return of blood to the heart, and to consequent failure of the circula-

tion. Only by such extreme inflation of the lungs as would produce that effect were Janeway and Ewing able to repeat Henderson's observations. The evidence for Henderson's theory is not substantiated by other investigators. His view, therefore, that rapid respiration plays a primary rôle, may reasonably be regarded as erroneous.

\* If the changes in respiration are not primary, they are probably secondary to some other condition. In a previous Shattuck Lecture, given by Edsall, in 1912, he suggested the probability that excessive accumulation of acid substances may over-irritate the respiratory centre and thus produce increased frequency of respiration. This suggestion is pertinent to an explanation of the breathing in shock. The amount of blood circulating in the shocked individual is greatly reduced; the oxygen-carrying power of the blood, therefore, is diminished; though metabolism is probably reduced, the products of metabolism may fail to be properly oxidized; and there may be some increase in the hydrogen-ion concentration, an acidosis, through the development of fixed acids. Furthermore, the diminished oxygen supply to the respiratory centre itself may render it especially irritable. It is well known that reduction of the oxygen carried by the blood to the central nervous system will cause the motor cells to send the muscles into spasms just before there is a failure of action. A continued low oxygenation of the respiratory centre might keep it, therefore, in a condition of hyper-irritability, and this, with an increased hydrogen-ion concentration might be expected to produce the typical changes seen in shock and severe hemorrhage.

Rapid, superficial breathing, as Edsall has pointed out, diminishes the range of pressure-variations in the thorax and abdomen below that of normal respiration, and thus reduces the extent of the respiratory waves in the general arterial pressure. Indeed, experimentally, very rapid breathing may abolish entirely the respiratory blood-pressure changes. Conceivably this is an important safeguard for the heart, because, with a greatly reduced arterial pressure, a further diminution of the pressure, which would naturally attend each deep inspiration, might make such reduction in the flow of blood through the coronary arteries as dangerously to impair cardiac contraction. On the other hand, it is a part of the bad physiological state which constitutes shock, that the aid given the heart by the diaphragm in pumping the blood from abdomen to thorax is largely lost when respiration becomes rapid and shallow. And for this reason, and also because the skeletal muscles do not contract, all the work of maintaining the circulation falls on the ill-nourished heart.

We may conclude from these considerations, I think, that the respiratory changes are not primary but secondary in character, and that, though they are probably suitably adjusted to

the circulatory conditions which actually prevail in shock, they fail to retain factors important as accessories to the heart in promoting circulation of the blood.

#### DISTURBANCES OF CIRCULATION.

Clinically the signs of shock which can be attributed to circulatory changes are, as we have seen, a low arterial pressure, pallor, a small thready pulse and a cold skin. The pallor and the cold skin indicate that the blood no longer circulates abundantly in the peripheral vessels. The low arterial pressure has been ascribed to a lack of tonic contraction of the arterioles. But the small pulse indicates that the heart actually has only a slight amount of blood to put forth with each contraction. And since this factor alone would account for the low pressure, we may, temporarily at least, assume that the diminished output from the heart is primary in producing it. Obviously we are here dealing with various relations of the elements which maintain the normal head of pressure in the arteries. In order to judge carefully, it will be necessary to consider in some detail the rôle which each one of them plays. These are the contracting heart, the bulbar vasomotor mechanism affecting the tonicity of the vessel walls, and the volume of the blood.

*The Cardiac Factor.* The cardiac factor in shock has received some attention, especially from Howell, who has suggested that there is a paralysis of the cardio-inhibitory centre. Such a paralysis would naturally lead to a rapid beating of the heart. That the cardio-inhibitory centre is not unresponsive, however, was proved by Mann. He stimulated the central end of the cut vagus nerve and found that the characteristic reflex slowing of the heart occurred as usual. Furthermore, the administration of adrenalin caused dropped beats, just as under normal conditions when adrenalin is allowed to affect the centre. It is known that increase of intracranial pressure stimulates the cardio-inhibitory centre and slows the heart. This effect, likewise, can be seen in experimental shock. The nervous control of the heart, therefore, is not impaired. Indeed, the rapid cardiac beat with a low arterial pressure is precisely what is to be expected according to Marey's law of the reciprocal relation between heart rate and arterial pressure.

The heart itself is not defective in the shocked individual, as can be shown experimentally. Mann raised the arterial pressure to a high level by injecting adrenalin, and also by cerebral compression, and found that as soon as the cardiac muscle was properly supplied with blood it promptly met the situation and contracted with vigor.

Low arterial pressure may incapacitate the heart, for Markwall and Starling have found that when systolic pressure falls below 80 mm. of mercury, the cardiac contraction begins to weaken. Moreover, as Evans has shown,



when the hydrogen-ion concentration of the blood increases, the heart relaxes more and more and beats less energetically. The important considerations, therefore, with reference to the cardiac factor in shock, are to increase the volume of well oxygenated circulating blood so as to lessen the dangers of acidosis and to raise arterial pressure to such a degree as to provide a proper flow through the coronary vessels.

*The Vasomotor Factor.* Since the cardiac factor is not primary, nor any of the other factors that we have thus far considered, let us turn our attention next to the blood vessels. We now come to questions which have been the subject of a great deal of investigation during the past few years. The natural inference of observers, when they found that arterial tension was very low, was to assume that this was due to such relaxation of the arterioles that the blood met greatly decreased resistance in its passage through them, and in consequence there was no support for the head of pressure which the heart might otherwise develop. This was the view long ago expressed by Mitchell, Keen and Morehouse. The view has recently been elaborated by Crile in extensive investigations, both physiological, on blood pressure, and histological, on nerve cells taken from shocked animals. The mere fact, however, that arterial blood pressure is low is not proof that the vasomotor centre is inactive or exhausted, for arterial pressure is low also in consequence of hemorrhage,—that is, when there is only a small volume of blood for the heart to put forth as it contracts. Furthermore, as has been proved by W. T. Porter and his collaborators, both pressor and depressor reflexes still occur even when an animal is in extreme shock. The depressor effects prove that some tonic activity of the centre is still present, for otherwise its action could not be depressed; and the pressor responses reveal that the centre is still capable of increased action. These observations by Porter have been confirmed by Seelig and Lyon and by Mann.

Since the vasomotor centre is not exhausted, the question arises as to its actual condition in shock. The evidence obtained in recent observations points towards an effective contraction of peripheral and visceral arterioles in the shocked state. Indeed, the pallor of the victim of shock indicates peripheral vasoconstriction. And the sweating and dilated pupils indicate that the sympathetic system, as a whole, is active. It is not necessary, however, to take indications merely, for Seelig and Lyon found that severing the nerve to a blood vessel which, in a shocked animal, was bleeding, resulted in a larger flow of blood from the vessel,—a result which could occur only because of relaxation of a tonically contracted structure. Later Seelig and Joseph found that if the blood pressure in a rabbit which was in a state of shock was suddenly raised by clamping the aorta, the blood greatly distended the arteries of

one ear whose nerves had previously been cut, but failed to distend the arteries of the other ear, whose nerves were still connected with the vasomotor centre. In other words, the centre was holding the arteries in effective contraction. Similar observations have been made by Mann on internal organs. And Morrison and Hooker have noted that the organs of an animal in shock have an outflow from their vessels when perfused which is less than that under the same pressure in normal conditions. Severance of the nerves of such an organ results in an increased outflow. All these observations taken together definitely prove a continued and efficient activity of the vasomotor centre, rather than its exhaustion.

It must be granted that, though not exhausted, the centre may be depressed, for, according to Sollmann and Pileher, a moderate hemorrhage lessens the capacity of the centre to control the vessels. It is clear, however, that such depression might not be of significance in a condition in which the arterial pressure was extremely low, and in which, therefore, the labor to be performed would not be great.

There remains to be considered the histological evidence for exhaustion which has been brought forward by Crile and Dolley from examination of nerve cells taken from shocked animals. Such evidence is subject to many grave mischances. For example, other investigators have reported that the cytological changes described as occurring characteristically in shock are found well within the range of normal variations of neurone appearances. Furthermore, as Dolley himself has admitted, hemorrhage produced the same changes in nerve cells that are seen in the shocked animal. Since both hemorrhage and shock are accompanied by a very low blood pressure, the admission immediately permits the conclusion to be drawn that the alterations in nerve cells, even if genuine, may reasonably be the result of shock rather than its occasion.

In connection with this discussion of the hardness and capacity of endurance of the vasomotor centre we should remember that all the testimony at hand points to its being extremely resistant to adverse conditions. Studies made by Pike, Guthrie and Stewart have revealed the fact that this centre is more capable of withstanding the adverse influences of anemia than any other vital bulbar centre—the respiratory, the cardio-inhibitory, or the swallowing mechanisms. It is well known, furthermore, that when there is danger of shutting off the blood supply to the vasomotor centre, it becomes immediately more active, so as to produce stronger contraction of the arterioles. Thus when increase of cerebral pressure tends to deprive this centre of its nutriment, it contracts the arterioles. In consequence, the arterial pressure is promptly raised. It may be maintained at a high level for a considerable period; Cushing has reported a case of fracture of the

base of the skull in which the arterial pressure was held higher than 160 mm. for five days. Obviously we must respect the vasomotor centre as an agent whose functions are extremely stable and whose capacities for continued action are its most outstanding feature. And only adverse circumstances are required in order to make it spontaneously become even more active than normal.

*The Factor of Blood Volume.* If, then, the vasomotor centre is efficiently at work, why does not the blood accumulate in the arteries? The answer to this question lies, I believe, in the diminished volume of blood which is in active circulation. Henderson has clearly pointed out the necessity of a sufficient supply of blood to the heart in order to maintain the arterial pressure at its normal level. In the absence of this supply, as, for example, in hemorrhage, the arterial pressure falls to a low level, and can only be permanently raised by introducing more fluid into the circulatory passages.

A further question now arises, as to where the blood lies in the shocked individual. There is general agreement that it is found in the capacious splanchnic area. One needs only to put a clamp on the portal vein to demonstrate that in a short time the blood pressure will fall to the same degree that it falls in severe bleeding. The capacity of this area for storing the blood is so great that, as has long been recognized, one may bleed to death in his own splanchnic vessels. The evidence for the gathering of blood in this region is found in observations on the mesenteric veins which, as Mann, and also Morrison and Hooker have pointed out, become very conspicuous in the shocked animal. The latter observers also took occasion to weigh an isolated loop of the gut as an animal went into a state of shock and found that the weight gradually increased.

That the quantity of the blood in the portal differs more or less from that in the general circulation is probable from the observations which Mann has made on the specific gravity of blood in shock, which he found higher in the portal vein than elsewhere. According to Corbett, who quotes McClendon, the blood in the general circulation in shock has no noteworthy increase of hydrogen-ion concentration. And the Guthries report that the circulating blood is not notably changed in its specific gravity, concentration or viscosity in a shocked animal. It is quite possible, however, that the blood which accumulates in the splanchnic region and which may be modified by gases absorbed from the intestines, has a higher carbon dioxide content than that found in peripheral vessels. Undoubtedly the portal blood is venous rather than arterial, and for that reason alone would be, in any case, somewhat changed in the direction of acidity.

The acidity or venosity of portal blood may be an important element in the continuance of the state of shock. Hooker has observed that carbon dioxide in minimal effective amounts always

causes relaxation of vascular muscle, whereas oxygen is essential to the rhythmicity of the muscle and to the maintenance of its tone. These conclusions are based on observations made on the portal vein of the rabbit and the cat. Gaskell and also Bayliss have found that other acid, as, for example, lactic acid, has the same effect as carbon dioxide. Obviously, if the venous blood stagnates in the portal vein, and has a large content of carbon dioxide, the condition would be one which would favor relaxation rather than contraction of the vessel wall. Furthermore, the tendency to acidosis, due to the diminished volume of blood in the general circulation, would lead to an increase of the evil effects. These facts are evidently pertinent to the condition that prevails in the region where blood accumulates in shock, for they are favorable to relaxation and consequently to greater capacity of the portal area, especially in the large vessels where vasoconstrictive impulses are least effective.

#### THE CENTRAL PROBLEM IN SHOCK.

Our review of the conditions which prevail in the shocked individual has shown that the diminished sensitivity, the lack of muscular tone with indisposition to move, and the rapid weak pulse, the sweating, the lowered temperature, may all be accounted for as secondary phenomena. The capacity of the central nervous system of returning to its normal functions if properly supplied with blood suggests that not only sensation, but also reflexes, spontaneous movements, normal respiration, more vigorous cardiac activity, and a normal control of the blood vessels by the vasomotor centre, may all be recovered if only the blood can be restored to the general circulation in sufficient volume to bring to the needy tissues their required nutrition. As Mann has pointed out, the conditions of shock and of severe hemorrhage are practically identical, and just as in hemorrhage, blood is needed to render the individual normal, so in shock the restoration of the stagnant blood to general circulation is the prime requirement.

The question now arises as to what prevents the blood gathered in the splanchnic area from returning to the general circulation. The effect of blood laden with carbon dioxide in relaxing vessels and making them more capacious has already been noted. Besides this, however, it seems to me that there is another factor of considerable importance for the continuance of the state of shock which has thus far been overlooked. We must remember that the portal circulation is almost unique in the body. The portal vein lies between two capillary regions—the capillaries in the stomach and intestines, pancreas and spleen, which deliver their blood into the mesenteric branches of the portal, and the capillaries of the liver, through which the blood must flow before being gathered in the hepatic veins and carried to the inferior vena

cava. Work must be done to drive the blood through these fine divisions of the vessels. There is a drop of blood pressure from the aortic level at 120 mm., or thereabouts, to the portal level, which is approximately 10 or 12 mm. of mercury, and a further drop in passing through the liver to approximately zero pressure in the inferior vena cava. The drop of pressure from the aorta to the portal vein is due to a using up of the energy of arterial pressure in overcoming frictional resistance in the stomach, intestines, spleen and pancreas. The drop of pressure from the portal vein to the inferior cava is due to a using up of the energy of the portal pressure in forcing the blood through the liver. Obviously, considerable force is required to keep the circulation going through the hepatic channels.

There has long existed evidence that the branches of the portal vein in the liver are subject to nervous control. Bayliss and Starling, in 1894, brought circumstantial indications of a nervous government of the portal branches sufficient to dissociate the portal area from influences affecting the rest of the circulation. Cavazzani and Manca, the next year, reported that asphyxia could definitely lessen the rate of flow of fluid through perfused liver venules, a result which was accounted for by the well-known increase of activity of the vasomotor center in asphyxial conditions. And later Schmid, and also Opitz, showed that stimulation of the portal nerve plexus of the liver, electrically or the introduction of adrenalin into the portal vein, would cause a considerable increase in the resistance of the blood flow through the hepatic vessels. From these facts it is reasonable to conclude that the way out from the portal area is subject to vasomotor impulses.

As we have already noted, any condition which endangers the blood supply and the proper oxygenation of the vasomotor centre results in an increased discharge of impulses from it. The observations already cited, proving that there is a constriction of the arterioles in shock, reveal the response of the centre when the blood supply is low. All the facts we have at hand point towards a diffuse influence of the centre on the blood vessels which it innervates,—in other words, it does not contract blood vessels here and there and leave others uncontracted. And since the arterioles of the abdominal viscera are contracted when the arterial pressure is low, there is every reason to believe that the fine branches of the portal vein in the liver are likewise contracted. Indeed, the experiments of Cavazzani and Manca, mentioned above, confirm the correctness of this inference. Contraction of these small hepatic vessels would be effective in restraining the blood from its onward passage, *unless the pressure from the arteries is high*. But that important factor is lacking. *Thus if the blood is once accumulated in the portal area to such a degree that the vasomotor centre becomes more active, the blood would*

*naturally be trapped in this area and held there, chiefly because the centre is stimulated to action and the arterial drive is lost*. In other words, there would be a critical point in this accumulation of blood in the splanchnic area at which a vicious circle would be entered; the vasomotor centre not sufficiently supplied with oxygen, would become more active, and by shutting up more blood between the two capillary regions of the portal area deprive itself still further of its required blood supply, and reduce still further the arterial pressure. From a consideration of all the facts at hand, it seems to me that this is the most remarkable explanation for the stagnation of the blood in the splanchnic vessels in shock.

If the views which I have expressed above are correct, then there seems to be a greater hope for the treatment of shock than has been offered by recent investigators. In a paper published in 1914, Short declared that it was hopeless to attempt to do anything for the shocked victim. He admitted that something might be done for the paralyzed vasomotor centre and that carbon dioxide could be given for acapnia, but what, he asked, could be done for exhaustion of the nerve cells of all the vital centres—the condition which Crile especially has assumed to be present. As the studies of Stewart and of his collaborators have demonstrated, however, the changes that occur as a result of diminished blood supply are, within limits, reversible changes. And of all of the vital centres of the medulla, those controlling the circulation are among the most resistant to anemia, and are the first to recover when an adequate blood flow is returned to them. They and all the other disturbed organs are suffering from inadequate provisions. The sensory synapses, the motor cells, the heart, the respiratory mechanism, are all in need of blood. The strategically important move, obviously, is to bring back into the general circulation *as promptly as possible* the blood which is stagnant between the two capillary regions at either end of the portal area.

The need of improving the circulation in shock has long been recognized. Such measures as injecting warm salt solution, introducing adrenalin into veins, placing the patient in a slanting, head-down position, bandaging the limbs, and compressing the abdomen, have for many years been employed in treating shock. In the light of present knowledge it may be questioned whether any of these methods strike effectively at the disturbed conditions in the portal area. Salt solution raises arterial pressure for a time, but soon fails, as it passes out through capillary walls into tissue spaces. Adrenalin, likewise, temporarily raises arterial pressure; not by driving blood out of the veins, however, but by inducing extreme contraction of the arterioles. There is no evidence that it affects the portal area in any favorable sense. Indeed, according to the early observations of

Oliver and Schäfer, recently confirmed by Hartmann, adrenalin causes especially contraction of the splanchnic arterioles, while arterioles elsewhere are distended,—an effect just the reverse of that needed to drive the portal blood through the liver. What happens in the splanchnic vessels under such circumstances was shown by Schmid, who found that the flow of blood through the portal vein could be brought to a complete standstill by intravenous injection of adrenalin. This agent, therefore, does not hit the mark. In judging the effects on the portal area of abdominal compression and the inclined head-down posture, we must not forget that the abdominal contents move freely, and exert a hydrostatic pressure equal to that of the blood itself. If the blood has already largely accumulated in the portal region, and vasomotor activity, unopposed by any considerable arterial pressure, is tending to hold it there, abdominal compression and gravity cannot be dependable influences. For, just in so far as compression is applied, or the body is inclined head-downward, the pressure on the liver, through whose capillaries the portal blood must pass, is increased equally with the pressure on the vessels themselves, and probably, therefore, nothing tending to empty the portal vein will result. The inclined, head-downward position may be useful, however, in bringing the influences of gravity to bear on the blood in the systemic veins of the legs and trunk, and thus help to return it to the heart. It would also add a slight hydrostatic element to the arterial pressure in the brain. Restriction of the systemic circulation by bandaging the limbs would have similar effects. That these aids may be favorable to restoration of normal conditions, especially at the critical stage, when the vicious circle, mentioned above, may be entered or escaped, cannot be denied. But, as we have seen, they fail to meet the problem presented by the capacious splanchnic area. To drive blood from this area, some agency must be employed which will affect directly the portal vein and its branches.

At present it is impossible to state with exactness what may be done practically to control the portal area. Theoretically, however, I should like to point out certain factors which seem to me important, and which may be employed to restore normal conditions. The portal vein and its branches have smooth muscle in their walls. This smooth muscle is highly contractile. One needs only to endeavor to introduce a cannula into one of the small branches of the vein to observe that it will contract to an extremely fine tubule hardly larger than a thread. The capacity of muscular contraction to diminish the lumen is present, therefore, in the vessel wall.

The smooth muscle of the wall is separated on the one side from the blood by the intima, but the vessel lies in the mesentery, and the smooth muscle is, therefore, covered on the other side by only a thin serous coat. It is possible,

consequently, that the smooth muscle might be affected by the application of a constricting agent applied to the outer covering. The introduction of a constricting fluid into the abdominal cavity in considerable bulk would make its way among the loops and folds of intestine and mesentery and come into relations with the vessels which contain the stagnant blood. And if the constricting agent penetrates to the smooth muscle, the vessel should, by its contraction, put such pressure on the contained blood as to drive it past the portal branches of the liver and on into the general circulation. A stronger solution of such an agent may be employed in the abdominal cavity than would be present in the circulating blood because it would not be diluted by the volume of the blood itself. Thus there might be effective contraction of the portal vein and its branches, as they lie outside the liver, by an agent acting precisely where there is need for action, and not diffusely over the whole body.

An agent effective in causing contraction of smooth muscle, which is found naturally in the body, is pituitrin. I do not wish to elaborate at the present time on the possibility of using pituitrin, as above indicated, in shock cases. The possibility is evident, however, because pituitrin appears to have a special affinity for smooth muscle, causing such muscle to contract whenever brought into relation to it. In the abdominal cavity it would cause contraction of the smooth muscle of the intestines and thus bring pressure to bear on the radicles of the mesenteric veins lying beneath the intestinal muscular coats. It would also contract the smooth muscle of the larger veins. But before anything definite and practical can be made of this suggestion, it must be tested out carefully on a considerable scale. This I hope to do in the course of future work, and if favorable results arise from these tests, I shall report on them.

For the present I wish merely to leave with you the main results of the analysis of shock which we have been through. We have seen that evidence favors considering the altered sensitivity of the patient, his indifference to surroundings, his tonelessness, his hurried respiration and rapid heart, as secondary to the low arterial pressure, for the same alterations of function are observed in severe hemorrhage. In shock, however, the blood is lost from the circulation by accumulating in the portal area, an area which is unique in lying between two capillary regions, and the exit from which is governed by vasomotor influences. Since low blood pressure increases vasomotor activity, the blood accumulated in the portal area may be trapped between the contracted splanchnic arterioles and the contracted portal venules in the liver. The central problem of shock, therefore, is to return the stagnant blood to the circulation, in order to give the heart and nervous system their proper



nutriment. The methods thus far employed do not approach this problem by direct attack. And I suggest in closing that an intra-abdominal therapy, the use of a constricting affecting directly the smooth muscle of the portal vein and its branches, may be developed, which will drive back into currency the idle blood.

### Original Articles.

#### THE RECOGNITION OF PANCREATIC INSUFFICIENCY, WITH SPECIAL REFERENCE TO THE LOEWI TEST.

By H. RYERSON DECKER, M.D., PITTSBURGH.

[From the Biochemical Laboratories of the Western Pennsylvania Hospital.]

THERE are no more complex problems in the field of medicine and surgery than those concerned with the recognition and treatment of pancreatic insufficiency. This is not surprising in view of the fact that many matters pertaining to the structure and functions of the pancreas are yet unsettled. For example, there is still a difference of opinion as to whether the islands of Langerhans are groups of resting acinar cells, or have independent origin and function. Again, the matter of the internal secretion of pancreas and its relation to the internal secretions of other organs is far from being completely understood.

From a clinical standpoint there is no pathognomonic pancreatic symptomatology. The symptoms of acute or chronic disease may either simulate or be overshadowed by symptoms due to disease in the neighboring colon, stomach, duodenum, or gall-bladder. At times there will be fairly definite evidence of pancreatic insufficiency—for instance, "the fatty stool"—but more often this disturbance will occur late, perhaps so late as to put the individual beyond the aid of medical or surgical therapeutics.

At operation of course it is possible to recognize gross pancreatic lesions such as cyst, tumor or abscess, but many surgeons feel, as we do, that it is not possible to tell by direct palpation and inspection of the pancreas the extent or severity of an inflammatory process. A hard pancreas does not necessarily mean a diseased pancreas. Such knowledge can be obtained with certainty only by microscopic study of sections of the gland. At times it becomes of considerable import to the surgeon to know, in the course of other operative procedure, whether or not the pancreas is diseased. For instance, it may determine his decision for or against drainage of the biliary ducts. One has only to go through the tragedy of a fatal case of pancreatitis to hope that there is something in surgical prophylaxis in these cases, and, secondly, to wish that

there might be some definite criterion by which disease of the pancreas might be recognized early.

Many laboratory tests have been devised to aid the clinician in the recognition of pancreatic insufficiency. In a recent comprehensive review of the subject, to which we are indebted for many of our data, Sladden discussed twenty of the more important methods of examination.

It is beyond the limits of this paper to give these more than a brief discussion, with the exception of the adrenalin test of Loewi, with which we have had considerable personal experience.

#### I. TESTS OF EXTERNAL SECRETIONS.

*Oil Test Breakfast.* This method of examination was proposed by Boldyreff and Volhard when they found in experimental work on dogs that olive oil introduced into the stomach caused a regurgitation of duodenal contents. 200 cc. to 250 cc. of olive oil or cream are administered, and in from 30 to 45 minutes the stomach contents, which have been rendered less acid by milk of magnesia (as suggested by Lewinski) are removed, and the tryptic activity ascertained. One fault with this test is that many patients cannot swallow or retain the oil. In others regurgitation from the duodenum does not take place, and, finally, gastric juice is known to inhibit tryptic activity, as also will carcinoma or leucocytic ferments, if present.

Duodenal intubation offers an ideal method in theory, because it seeks to recover pure pancreatic juice and unmixed ferments. The Eihorn duodenal catheter or modification is given the patient to swallow at night, and duodenal contents are aspirated two and one-half hours after a test meal of eight ounces of milk the next morning. The activity of trypsin, diastase and lipase is then determined. Except in cases of pyloric obstruction or pylorospasm, it is not difficult to obtain pancreatic ferments in this way. The main criticism of the method is directed to the wide variations in the activity of the enzymes under normal conditions. Chace and Meyers think it is so variable as to preclude diagnosis of pancreatic interference, except possibly achylia pancreatica. Crohn, on the other hand, working at Mt. Sinai Hospital, New York, believes duodenal intubation to be the most valuable method in recognizing pancreatic disease, and we are inclined to agree. His conclusions, based on a study of 120 cases by this method, are: 1. Diminution of the enzyme activity of the pancreas is a reliable sign of organic disease of the gland, especially in the acute and chronic intra-acinar types of inflammation. 2. Occasionally, though rarely, a diminution of ferments occurs as a symptom of advanced organic disease elsewhere in the body. 3. Roughly, the diminution of ferments is directly proportional to the extent of organic destruction which has taken place. 4. Some cases of pancreatic disease, not associated with wide-

spread destruction of the parenchyma, continue to furnish a secretion of normal enzyme activity.

**Glutoid Capsule Test of Sahli.** Sahli administers a gelatine capsule specially hardened in formation, to resist action of the gastric juice, containing an indicator such as salicylic acid or methylene blue, which, set free by pancreatic digestion, is absorbed, and can be tested for in the urine. Absorption occurs normally in four hours. If there is no absorption in five hours there is pancreatic insufficiency. Most investigators do not share Sahli's confidence in this test. Pratt, for instance, found in a normal case great delay in absorption, and in a case of carcinoma, absorption within four hours. Certainly, if there is gastric stasis for any reason, the results are vitiated.

**Schmidt's Cell Nuclei Test** is based on the theory that nucleases of the pancreas are responsible for the digestion of cell nuclei. He administers beef muscle cut into cubes, hardened in alcohol and wrapped in silk bags to aid identification in the feces. When recovered, the bags are mounted in paraffin, sectioned, stained, and cells are examined for nuclei, which are intact if the test is positive. Kashiwado substituted special nuclei from the thymus gland and Fronzig nucleated red blood cells of frogs or geese mixed with barium sulphate as an indicator. The method is open to the criticism that nucleases of the succus entericus and enzymes of bacterial origin endowed with nucleolytic properties are normally present in the intestine in sufficient quantities to digest nuclei. There is a second limitation in that the bags must remain in the intestine not shorter than six hours nor longer than thirty, on the one hand to allow pancreatic enzymes full action, on the other hand to avoid the harmful influence of intestinal putrefaction. Excessive or delayed activity of the intestine, therefore, will interfere with the test. So, while it has support in some quarters, most investigators place little confidence in results obtained by it.

Examination of the feces, physical and chemical, has long been a fruitful field for investigation of pancreatic functions, both from the standpoint of food digestion and food absorption, inasmuch as the pancreas not only furnishes a major digesting fluid, but also, in the light of recent researches, is known to have a most important influence upon, if not control of, the absorption of nitrogen and fat.

**Azotorrhea**, by which is meant an excess of nitrogen compounds in the feces, may be, then, due to a failure in the digestion of proteins or failure in the absorption of proteins. The average normal total nitrogen loss is 5-10% of the intake. If it exceeds 30%, it is the consensus of opinion that it points to pancreatic insufficiency. The test should be conducted as any metabolic study, with the patient on a fixed standard diet such as Schmidt's. One must remember that other proteolytic agents are at work, such as erepsin and

those of bacterial origin, which may influence the results; also the fact that tuberculosis and other inflammations of the intestine may interfere with the normal process of absorption.

**Creatorrhea**, the presence of an excessive number of muscle fibers in the feces, which normally are never more than two to a microscopic field, usually none at all, on a meat ration of 2 oz. a day, is a sign which has considerable positive significance, less negative; though, as Pratt has observed, no creatorrhea has been found in cases where pancreatic insufficiency has been excluded. Excessive peristalsis will vitiate the result as will, in Albu's experience, achylia gastrica.

**Tryptic Power.** Estimation of the tryptic power of the feces by the serum plate method of Muller and Schlecht or the casein method of Gross, in spite of Gross's enthusiasm, has not been found very accurate, but has some confirmative value. Erepsin again is a disturbing factor.

**Steatorrhea**, the familiar fatty stool, voluminous, rancid, oozing fat globules, has long been recognized as evidence of pancreatic insufficiency. Normally there may be 20-30% fat contents, present either as neutral fat, free fatty acids, or soaps. When the fat contents exceed 30% in dried feces, pancreatic disease is probably present, providing intestinal disease, excessive peristalsis and biliary insufficiency can be excluded. Low percentage of soaps, and high percentage of split fat also point to pancreatic disturbance, yet exceptions are not uncommon. Garrod and Hurtle, for instance, have reported a case of congenital family steatorrhea, and Keuthe a case of complete atrophy of the pancreas with normal fecal fat. If excess fat content is diminished by the administration of pancreatic products, such as raw pancreas, a pancreatic lesion is probably present.

Lipase and diastase in the feces are subject normally to wide variation, and so for diagnostic purposes have served no useful end.

**Lecithin.** Deucher, in 1898, pointed out that lecithin was present in abnormally large amounts in cases of pancreatic lesion. A normal twenty-four hour excretion is about one-half gram. Inasmuch as the pancreatic juice only is responsible for splitting lecithin, it would seem a valuable test. Von Ehrmann, however, has pointed out that absorption of lecithin is quite enhanced by the presence of bile, so that an excessive excretion may be rather an expression of biliary insufficiency.

## II. TESTS DEPENDENT UPON FUNCTION OF THE PANCREAS OTHER THAN THOSE OF EXTERNAL SECRETIONS.

That the pancreas has functions independent of its external secretions is well understood, but in what fashion it exercises these functions is not entirely clear. The results are attributed to the agency of an internal secretion, the compo-

sition of which is not known, nor its precise relation to the internal secretions of other glands.

By its internal secretions the pancreas exercises a control over the absorption of fat and nitrogen, as we have already pointed out, and also a definite control over carbohydrate metabolism, a disturbance of which is often recognized by glycosuria. But glycosuria is by no means a constant symptom of pancreatic disease. Cammidge, in a large experience, found it in 74% of his cases. On the other hand, in cases of glycosuria only 30% had evidence of pancreatic disease; so that glycosuria, and also alimentary glycosuria, as an expression of lowered sugar tolerance, are to be put in the category of tests that have confirmative value. Cammidge, in 1904, announced a reaction in the urine which he considered diagnostic of pancreatic lesion. He found a dextrine-like substance excreted in the urine, which on hydrolysis yields a pentose body (pentozazone) with definite crystalline characteristics. No test has received more attention from investigators than this. The majority feel that the reaction, even as modified in his "new iodine coefficient method," is not pancreatic in its significance, but that it is an index rather of a disturbance of carbohydrate metabolism, which may or may not be associated with diseases of the pancreas.

*Diastase in the Urine.* In 1908, Wolgemuth, in working out a method to test the diastatic power of the urine, found that in pancreatic lesions the amount of diastase was remarkably increased. The simplicity of the technic as modified by Geyelin makes it useful. It consists of arranging a set of test tubes, each containing a known amount of soluble 1% starch solution, to which is added the urine to be tested; each tube in the series contains one-half the amount of urine in the preceding. These are incubated for 24 hours, and tested as to the extent of digestion by deci-normal iodine solution. Corbett, Noguchi and others have confirmed Wolgemuth's work, and feel that a high diastatic content of the urine points distinctly to pancreatic lesion, and is particularly constant in acute pancreatitis and traumatic lesions. Renal disease, which tends to lower diastatic content, must be excluded. Our own experience in a series of 25 cases using Geyelin's modification was not conclusive, the highest readings being in cases of appendicitis and ovarian cyst, with no obvious pancreatic lesion, and the lowest readings being in a case of carcinoma of the head of the pancreas.

*Loewi Adrenalin Test.* Loewi, in 1908, found in a series of animal experiments relative to diabetes and pancreatic function, that adrenalin chloride, in a strength of 1 to 1000, when instilled in the conjunctival sac of dogs and cats, normally caused no mydriasis. In animals, however, from which the pancreas had been removed, thus setting up a complete pancreatic insufficiency, mydriasis occurred constantly, in

from 25 to 65 hours after operation. In another series of dogs in which the pancreatic juice was diverted through an external fistula, no mydriasis occurred, even after many months. From this Loewi concluded that mydriasis was the result of the failure of the internal secretion of the gland. On the basis of further experiments in dogs in which diabetes had been established, he concluded that the internal secretion had at least two independent functions,—the glyco-genic function and the adrenalin function. His argument in explanation of the phenomenon of mydriasis is that the pancreas furnishes, through its internal secretions, a chemical substance which is a depressor, or inhibitor, of the sympathetic nervous system. So, when adrenalin, which is a sympathetic excitant, is instilled in the normal eye, the sympathetic nerves supplying the ciliary muscle are stimulated, but not sufficiently strongly to overcome the pancreatic inhibition. If, by reason of disease this inhibitory control of the pancreas is vitiated or lost, adrenalin is unobstructed, or less obstructed, in its action and causes mydriasis.

Whether this hypothesis of Loewi is the true explanation of the phenomenon or not is open to question. In view of the present uncertainty regarding the antagonism of pancreas and adrenals, and, indeed, the influence of all glands of internal secretion upon one another, one perhaps should be slow to accept it. At least, however, no more rational theory than Loewi's has come to our notice. Loewi found that normally the human eye did not react to adrenalin. He tried the reaction in 48 clinical cases, embracing such conditions as carcinoma, nephritis, tuberculosis, pneumonia, rheumatic fever, and diabetes. In 36 there was a dilatation of the pupil averaging one mm. His series included 18 cases of diabetes of which 10 had mydriasis, and 3 cases of Graves' disease, all of which reacted positively. This latter result Loewi explained on the ground of a hyperactivity of the sympathetic system in hyperthyroidism, which is in excess of the pancreatic depressor influence. One writer, Cords, has since accounted for mydriasis in the presence of exophthalmos on the basis of a corneal inflammation, leading to a more rapid absorption of the drug.

Since Loewi published his paper in 1908 there have been comparatively few reports in the literature of experience with the test. It is looked upon with favor by several English clinicians, notably Garrod, Humphrey and Sladden. Zak, in Germany, found it undependable as a pancreatic guide, obtaining positive results in many cases with lesions of the stomach, intestine and peritoneum.

Sladden, however, at St. Bartholomew's Hospital, in a series of 51 tests, found 11 positive cases. Of these 11, in 5 pancreatic disease was demonstrated, in 4 it was probable, in 1 there was exophthalmic goitre, and in the last one only it was excluded at operation. On the basis

of this experience Sladden writes that the adrenalin reaction is associated with pancreatic disease, and with lesions closely associated with the pancreas either anatomically or physiologically, so frequently as to render the phenomenon worthy of serious attention as a guide in diagnosis.

Our own experience is limited to a series of 500 cases from the surgical and medical wards of the West Penn Hospital. The technic followed was that recommended by Loewi. Three drops of adrenalin chloride solution 1-1000 were instilled in one conjunctival sac, the other eye being used as control, and followed in five minutes by three more drops, the point being to fill the conjunctival sac. Aside from a slight smarting for a few seconds, the patient suffered no discomfort, and no subsequent harmful effects. Dilatation of the pupil should occur within an hour if the test is positive. The amount of enlargement varies from less than a millimeter to complete pupillary dilatation and occurs within a 15-minute period. The length of time taken for action seems to be dependent on the facility with which the adrenalin is absorbed, rather than on the amount used. Care is taken to exclude impaired or inflamed eyes.

In the 500 cases, which covered a wide range of injury and disease, there were 18 positive reactions, only 2 of which were known to have pancreatic lesion,—one, a case of carcinoma of the pancreas, the other, chronic pancreatitis associated with gallstones.

It might be of interest to note, on account of the etiological relationship which is thought to exist between gall-bladder and pancreatic disease, that in 15 gall-bladder cases there were 3 positive reactions. In only one of these was the pancreas involved.

From this record it is apparent: (1) that the reaction is not pathognomonic of pancreatic disease, (2) that it is absent in cases which by other methods are proved to have pancreatic lesions. Whether or not in 6 of the 18 cases there was an associated pancreatic lesion it is impossible to tell without a doubt. At least, judging either by clinical history, physical examination, tests of the urine and stools, or intra-abdominal examination at the time of operation, there was no definite evidence of pancreatic disturbance. On the basis of our present experience, then, we are compelled to report the adrenalin test of doubtful diagnostic value.

From this discussion it is quite evident that no tests at present are pathognomonic of pancreatic disease, or even meet the requirements of reasonable simplicity and reliability. Many are complicated chemical procedures, others are interfered with by concomitant disturbance of function in other organs. Many are merely confirmatory in value, or are of help positively but not negatively. A test is yet to be found which will point out a pancreatic lesion early and surely enough to enable the surgeon or thera-

peutist to determine with a high degree of success. It is often true that before definite evidence of pancreatic lesion is present, such as creatorrhea or steatorrhea, the gland is hopelessly damaged.

When the internal secretion of the pancreas and its metabolic functions are better understood, a more accurate and simple guide than we have at present may be forthcoming. In the meantime it behooves us as surgeons and internists to pay more attention to the pancreas in all abdominal cases, and by using the more important of these methods in our study of a case, to arrive at as accurate a knowledge as possible of the sufficiency or insufficiency of that organ.

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#### REPORT OF THE SPECIAL COMMITTEE APPOINTED BY THE CHAIRMAN OF THE MAYOR'S COMMITTEE ON THE TRAINING OF VOLUNTEER NURSES' AIDES IN NEW YORK.

Your committee to consider the question of a standardized course of training for nurses' aides, begs to submit the following:

It appears that a plan for the training of volunteer nurses' aides has already been worked out by the Red Cross Nursing Service, and that a course of instruction for that purpose has for some months been given in Base Hospitals. After carefully studying this plan in general arrangement and in detail, the committee finds that it provides a short, simple and well-thought-out course of instruction in theory and in practical work which, intelligently given, should enable those who have had it to give a good deal of useful service in hospital wards. With certain slight changes in the theory and a moderate increase in the amount of time devoted to certain practical procedures, the course appears to be a suitable one for the purpose for which it is intended.

With this plan, therefore, already in operation and seeming to promise satisfactory results, the committee is of the opinion that no good reason exists for establishing another plan and creating new machinery to carry it out.

The committee, therefore, recommends that



the plan of training for volunteer nurses' aides, now given in Base Hospitals under the auspices of the Red Cross Nursing Service, be accepted and extended to such other hospitals as may be approved by the Red Cross for the purpose, and that such courses wherever given should conform substantially to this plan and be carried on under the same auspices.

In view of the fact that hospitals, lacking proper educational facilities, and unable to offer a proper field for such training, are attempting to establish short courses of training, it is of considerable importance that such efforts should, as far as possible, be placed under the control of the Red Cross, which forms our National Nursing Service. In no other way can volunteer nurses' aides be given the official recognition which will make them available for service wherever they may be most needed.

The plan of training for volunteer nurses' aides in connection with base hospital units calls for a short course of theory covering 15 periods of 2 hours each (30 hours in all for theory), followed by a course of training in practical work in hospital wards, covering 24 periods of 3 hours each (72 hours in all for practice).

It is recommended that the courses of theory and practice be carried on in the manner described above, or concurrently, where that method proves more convenient to the hospital giving the course and that the period of practical work be increased from 72 hours to a maximum of 120 hours. This increase seems advisable, not in order that the range of work for which nurses' aides should be prepared may be enlarged, but rather that more time may be given them to acquire some reasonable degree of skill and reliability in the performance of the tasks to which they may be assigned.

The adjustment of the time in which these courses may be completed should be left to the hospital selected. It may be arranged to cover a term of two months, calling for five 3-hour periods weekly, preferably in the morning when the best opportunities are available for such training. This would mean 15 hours of practical work weekly, and the full 120 hours would require a period of two months for completion. This the committee considers the best plan. Where desired, however, it may be completed in one month, this plan calling for six hours of work daily for five days in the week. These plans outline the scheme of practical work only, and are in addition to the 15 periods of theory.

The general requirements laid down by the Red Cross for the training of Volunteer Nurses' aides are:

(a) That candidates for admission to the course should not be under 23 years of age nor over 50. (It is recommended that they bring in addition satisfactory evidence of a good English education and of good moral character).

(b) That a paid instructor be appointed for this special work, who shall preferably be an en-

rolled Red Cross nurse, selected by the Superintendent of nurses, and her appointment approved by the Red Cross Nursing Service.

(c) That the number of persons admitted to classes in theory should not exceed 20, and that for practical work not more than 10 should be admitted to any hospital at any one time for training.

(d) That the usual uniform for volunteer aides be worn during the training, but that the insignia of the Red Cross be allowed only when upon satisfactory completion of the course the aide is detailed to regular duty.

(e) That students entering for training as volunteer nurses' aides should be enrolled by the Red Cross Nursing Service and that examinations be conducted and certificates awarded through that service.

(f) That a suitable fee be charged for the course of instruction, of which 50 cents per capita be sent to the Bureau of Nursing Service at Washington.

With these general requirements and conditions your committee concurs, and recommends their adoption.

M. A. NUTTING,  
*Chairman,*  
A. N. MAXWELL,  
C. E. BETH,  
A. HILLIARD.

**COURSE IN MILITARY DENTISTRY.**—The courses which are being given under the auspices of the Government in military dentistry at Forsyth Infirmary, Boston, are being well attended. Already six hundred dentists have enrolled themselves for instruction. The one course originally planned has been expanded to three and may be still further extended, as but 180 men can be accommodated at one time. Each course lasts one week and includes lectures and demonstrations in anesthesia, asepsis, materia medica, surgical anatomy, nose and throat surgery, care of hospital in-patients, extracting, physiology and surgical bandaging. Special lectures will be given in military discipline and organization and the manual of the medical department.

In charge of the course, as instructors, is a large group of dentists. They include Drs. Freeman Allen, Timothy Leary, Frank Wheatley, Harry H. Germaine, Harold deW. Cross, director of the work; Albert Midgely, F. E. Jones, a major in the Massachusetts National Guard; William E. Chanery, Frank Lahey, Percy R. Howe, Harry B. Shuman, William A. Gobie, J. J. Hepburn, G. V. N. Sherburn and Howard Smith.

When the dentists finish the course at the end of a week they will be expected to take an examination under the charge of the surgeon-general, and a physical examination. If they pass both they will be declared available for army service, and will be called out as fast as the Government needs them.

# SOME UNUSUAL CONDITIONS OBSERVED IN 245 POST-MORTEM EXAMINATIONS AT DANVERS STATE HOSPITAL.\*

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In a service of more than two and one half years at this hospital, embracing 245 post-mortem examinations, a great variety of interesting and unusual conditions have been encountered. A number of the more interesting of these, which are not of sufficient importance to warrant separate notes, but are nevertheless striking enough to merit a place in the literature, have been brought together in this paper. For the most part, they are presented merely as facts of observation. Some of the conditions are perhaps not so unusual in other laboratories as in this. Nevertheless, the number and variety of the conditions here reported may serve as an indication of the remarkable medical and pathological material an institution such as this holds.

A great many other cases which might be included in such a series as this have been or will be reported either singly or in groups.

## HEAD AND CORD.

**Hemorrhage.** In one case of paresis (1789), age 38, there were hemorrhages into the dura of the head, beneath the dura throughout the extent of the cord, and beneath the arachnoid over the lower third of the cord. Death was sudden.

A non-paretic case (1860) showed clotted and fluid blood beneath the dura over the left hemisphere, most marked in the frontal region, with narrowing and lengthening of the hemisphere. There was also cortical hemorrhage in the left occipital region. Probable cause, head trauma.

Two cases of paresis (1894 and 1933) showed subarachnoid hemorrhages. The first died suddenly, when seemingly in good condition, and the hemorrhages involved the arachnoid around both Sylvian fissures. The second had been very violent. The hemorrhage was limited to the arachnoid of the cerebellar notch.

Most unusual were the widespread subarachnoid hemorrhages in a non-syphilitic imbecile (1923), age 37, involving the base of the brain, the Sylvian fissures and the cord. Death was sudden, and the engorgement of the neck veins, with marked cyanosis of the face, had led us to expect some thoracic condition.

Hemorrhages into the substance of the brain, in the sense of an apoplectic stroke or shock, were relatively common, especially in the group of cases with well marked arteriosclerosis. How-

ever, hemorrhage into the meninges or between the meninges is an extremely uncommon finding. We have here five cases in which it was found. Three of these cases were paretic, in which there are, of course, lesions in the vessels which might cause this. In the fourth case, in which there had been trauma, the cause also seems clear. In the fifth case where the hemorrhages occurred in a non-syphilitic imbecile who was in excellent physical condition, the cause remains absolutely obscure. It may be noted that hemorrhage in paresis is a rare thing despite the lesion of the vessels.

**Tumors.** In a case of senile dementia (1780) was found a fibroma of the 8th nerve "about the size of a hazelnut." Hearing was "a little dulled."

A case of organic brain disease (1849) showed at autopsy a dural endothelioma, occupying the right cerebello-pontine angle, 5x5x2 cm. This was closely adherent to the pons and to the dura on the posterior surface of the petrous portion of the temporal bone. The pons and medulla were remarkably pressed out of shape, but stained sections show no degenerations in any fiber tracts. The tumor is an endothelioma.

This case had shown before death an internal strabismus and had much exaggerated knee jerks. Owing to the patient's marked confusion only an objective examination could be made, from which it was concluded that she had an organic brain disease with the possibility of a brain tumor.

In the whole series of 245 cases, 4 cases (including both of these) of brain tumor were found. In other words, brain tumors are uncommon among the insane.

As I have pointed out elsewhere, there have been a total of 28 brain tumors in the entire series of 1985 of Danvers' autopsies. This is perhaps a somewhat smaller percentage than is commonly found, but the fact remains that in not more than 5 per cent. of the insane are there brain tumors to account for their disorder.

A case of paresis (1896) of 5 years' duration showed a large mass covering the entire right frontal lobe, approximately 10x8x2.5 cm. with central cavity. This was closely adherent to the dura, and represents the classical extreme stage of internal hemorrhagic pachymeningitis. This condition in any of its grades has been uncommon in this series, although the minor stages have been encountered. This is, however, the only marked case.

**Meningitis.** Two cases of acute purulent leptomeningitis were encountered.

The first (1857) occurred in a man who had shot himself through the head five weeks previously, cutting the right optic nerve and just missing the left. The sella turcica was uninjured. The right eye had been enucleated. The orbital portions of the frontal lobe were necrotic and the dura was adherent. There was a purulent meningitis involving chiefly the base of the brain.

The second case (1972) represents an error due to the infantile paralysis scare of the past summer.

\* Contribution No. 65, Danvers State Hospital Papers.

The man's illness was thought to be poliomyelitis at first, but was later diagnosed meningitis. He was sent here as insane. The total duration was about 8 weeks. The autopsy showed a pronounced meningitis at the base. A short chain streptococcus was demonstrated, together with a pronounced polynucleocytosis. There was a double purulent otitis media and frontal and ethmoid sinus infection.

**Aneurysm.** An arteriosclerotic case (1980) showed, in addition to various softenings, a small aneurysm, 1.5 cm. in diameter, of the middle cerebral artery in the depths of the Sylvian fissure.

Arteriosclerosis of the cerebral vessels is a rather common finding. It is found on the whole in two groups of cases: in those whose psychosis comes on in advanced life where the arteriosclerosis may or may not be the etiological factor in the psychosis; and in a second group representing those whose psychosis comes on in earlier life but who live to an advanced age. Some idea of the probable amount of sclerosis may be gathered by the statement that about 60% of our autopsies are done on people over 50 at the time of death. This is the only case in which we found any aneurysm in the cerebral vessels.

#### BONES.

One case (1893), an old imbecile, showed osteitis deformans. The skull had several unusually marked prominences on it. In removing the calvarium, the outer table was several times broken through merely by pressure of the fingers. Its consistence was that of rotten wood, and its thickness varied from 1.5 to 2.5 cm. It was extremely cancellous.

The occurrence of persistent metopic suture in four cases may also be noted.

#### CARDIO-VASCULAR.

One case (1818), with a heart weighing 745 g., showed, at the apex of the left ventricle, an area of very marked thinning of the muscle, from 2.5 cm. elsewhere to .5 cm. Here there was a large grayish softened mass, which was easily removed. This was a very large thrombus (there was marked arteriosclerosis, fibrous myocarditis and chronic interstitial nephritis).

In two cases (1822 and 1842) there was thrombosis of the pulmonary artery; in the former, of several small branches; in the latter, of one large branch.

One case (1823) showed at 56 a thrombosis of the descending branch of the left coronary artery to account for the sudden death.

Autopsy No. 1981 is especially striking. This woman, age 52, had complained of pain in her legs for 3 weeks before death. About one week prior to death, the ends of the toes began to dry up, so they became hard, with a translucent yellowish-red appearance. For some days there was a marked purple color of the left leg, with swelling and induration, and a less marked condition in the right leg. At autopsy there was found a white thrombus filling the ab-

dominal aorta from about 5 mm. below the origin of the renal arteries, and extending into both iliacs and femorals. In the femoral arteries it became red. It extended beyond the point to which the arteries were traced down the legs, i.e., about half way to the knee. There was only moderate arteriosclerosis, but very marked anemia.

Autopsy No. 1982 is no less striking. This woman had passed a good night. In the morning she suddenly became ill, and died in a very short time, gasping for breath, the pulse small and weak. The autopsy showed a recent large hemorrhage into both adrenal capsules. Each adrenal weighed from 55 to 60 grams. There was moderate sclerosis of the aorta.

#### LUNGS.

A number of cases of pulmonary edema of obscure etiology were encountered. Probably the most striking lung condition found was in the following case (1788):

This woman, a case of dementia praecox had partaken freely of oranges and grapes the day previous. Later she became very restless, and vomited a few minutes before death. At the autopsy, there were large, undigested masses of orange fiber and half and whole grapes in the stomach. Similar material was found in the oesophagus, mouth, larynx, and plugging the left bronchus and partly occluding the right. Small pieces were found in smaller bronchi.

Two other cases in the series showed an acute lung condition due to aspiration of regurgitated stomach contents. In view of the large number of cases which require tube feeding, and the not inconsiderable number of cases who regurgitate their food to a considerable extent, the number of cases of asphyxiation or pneumonia due to aspiration is remarkably small.

#### INTESTINES.

Two cases (1837 and 1797) showed ulcers and multiple perforations of the caecum, with resulting peritonitis. One of these cases was operated on, because of symptoms of appendicitis, about three days before death. In this case, the lesions were definitely tubercular.

One case (1748) showed a strangulated femoral hernia. One side of the ileum had herniated and become pinched off. There was a typical picture of acute intestinal obstruction.

A very remarkable case was 1766. A very obese woman showed an enormous lobulated umbilical hernia, measuring 25 cm. across and protruding 20 cm. from the body wall. In this were the lower end of the stomach; all of the small intestines; the large intestine, excepting only the caecum and the lower end of the descending colon; the apex of the very large bladder; an adhesive band from the liver. This case also showed a large fibroid with a calcified shell, and calcified strands running from the center. The enormous hernia was strangulated.

Duodenal ulcer occurred five times (1771, 1916, 1926, 1927 and 1929). Three of these cases showed two ulcers. In four there had been

perforation, and in two both ulcers had perforated. One case (1771) is regarded, from the history and the histological examination, as a case of typhoid fever. The unusual location of the ulcers is very interesting.

Autopsy No. 1873, on a male paretic, showed a very soft, necrotic oesophagus and neighboring portion of the stomach. There had been a perforation in this region, and as a result the parietal pleura and visceral pleura over the entire posterior surface of the left lung had been digested away. The ribs were bared. Air could be forced out through the opened alveoli.

In case 1879 the caecum lay just to the left of the midline, with the appendix running off to the left. The ascending colon ran in the midline. The transverse colon was very short, running from the midline upward and to the left to the splenic flexure. The small intestines were all to the right of the ascending colon. This case represents an incomplete fetal rotation of the intestines.

In 1921 there was volvulus. The sigmoid was twice twisted on itself, forming a very complete intestinal obstruction.

In two cases small "pebbles," about the size of beans, were found free in the peritoneal cavity. These were calcified and may represent necrotic and calcified appendices epiploica.

#### GALL-BLADDER.

Gall-stones and chronic cholecystitis were very common in the series. One case (1978) deserves especial mention. Here there was a gall-bladder measuring 7x4.5x5 cm. The walls were thick and white, the anterior being 2 cm. in thickness. There was much calcification in the wall. The cavity measured 4.5x2.5x3 cm, and was packed with stones.

#### LIVER.

Cases of frank cirrhosis were very rare, despite the pronounced alcoholism of many cases. Two cases (1807 and 1910) showed scars on the upper surface of the liver. In one case there was syphilis, in the other it was suspected, but the Wassermann was doubtful. (This case—1910—also presented a condition which is unique in the experience of this hospital. Thus we have many cases of syphilis of the nervous system, and a number of cases of syphilis without involvement of the nervous system, but this is the only case in which we have found necrosis of the nasal septum and soft palate. The nose had the typical "saddle shape." The psychosis in this case was *not* due to neuro-syphilis.)

#### TUBERCULOSIS.

This has occurred to a marked degree in about 5% of the series, which is rather less than in former times. Two cases were very striking.

In the first (1833) a woman of 86 had what was regarded as a bronchopneumonia. There was atrophy of the liver. The mesenteric and retroperitoneal lymph nodes were much enlarged, firm and white,

leading to the supposition that there was a tumor which, however, was not found. Microscopically, there was a very remarkable miliary tuberculosis of lungs, liver and lymph nodes. In the liver the areas are very minute. In view of the age of the patient, this was absolutely unexpected.

In the second (1871) the man (54 years of age) had been feeling badly for about 10 days, but made no special complaint. There was pronounced tuberculosis of the lungs; of the peritoneum; miliary tubercles in spleen and liver; and an extremely marked tubercular process in kidneys, ureters and bladder. One kidney was merely a shell around a large mass of caseous material. Both ureters were greatly enlarged, with much thickened, very hard walls.

Considering the length of time the tubercular process must have been active, the absence of symptoms in this case, the man being up and working each day, is truly remarkable.

#### URETERS.

Pyelitis has been rather uncommon, as contrasted with its frequency in earlier years.

One case (1915) showed complete bilateral doubling of the ureter. That is, there was a double pelvis in each kidney; a double ureter on each side, and four independent openings into the bladder.

Such cases are rare, as judged by their infrequent appearance in the literature. They have been very infrequent here. There is one other case (1279) among 1985 autopsies in which there were two complete ureters on each side, with five openings into the bladder. One of the right ureters was drained by two openings.

One other case, showing double ureter on one side, with union before reaching the bladder, has occurred in this series.

#### TUMORS.

It has been stated above that tumors of the brain are relatively uncommon in the insane. This is no less true of the body organs in general; thus, carcinomata occurred in only very few cases and there has been no case of sarcoma. In one case (1824) there was carcinoma of the pyloric end of the stomach. One case of carcinoma of the prostate (1810) occurred. In one case (1883) there was a carcinoma of the epithelium covering the hard palate with metastases. There was one dermoid cyst; and two cases showed calcification of fibroids.

In 1817 there was a small primary carcinoma of the thyroid, with metastases to the liver and lungs. Case 1939 also showed carcinomatous areas in all the body organs.

The most interesting case was 1831, a woman of 34. There was a walnut sized carcinoma of the body of the pancreas, and a slightly larger hemangioma of the liver, neither of which was instrumental in causing death. The relative youth of the patient, the unusual situation of the carcinoma and the com-



bination of carcinoma of the pancreas and hemangioma of the liver in this case are all very interesting. If, indeed, tumors be due to fetal rests, one might think that there would also be in this case fetal rests or arrests in other loci, particularly the nervous system (to account for the psychosis). However, there was in this case no indication of tumor of the brain, and the brain, on the whole, was a rather normal looking one.

#### GENERAL.

One case (1891) is of considerable interest. This man, age 56, entered the hospital in a delirium which was ascribed to a cardiorenal condition because of the ascites and general edema. The autopsy revealed a generalized infection with the gas bacillus (nervous system not affected). The solid organs, such as the liver and heart, would float in water. The liver had the appearance of a rubber bath sponge. There was a large recently healed scar of varicose ulcer.

It is obvious that no attempt has been made to discuss the pathological findings in mental diseases. In further reports upon this series of autopsies by groups this will be done. We have not presented here the cases which were unusually striking from a psychiatric point of view. The attempt has simply been made to point out some of the more unusual physical conditions that have been found.

### SOME CONDITIONS LEADING TO INCORRECT DIAGNOSIS OF ADENOIDS IN CHILDREN.\*

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THE term adenoid, or adenoids, is used generally as descriptive of a mass of lymphoid tissue in the rhinopharynx producing abnormal symptoms. We say a child has or has not adenoids, though manifestly he must have some lymphoid tissue in the epipharynx; so the term is one of disease. Luschka and Waldeyer pointed out that this mass of tissue should be regarded as a tonsil ("Luschka's tonsil"), and the latter showed that there is normally a ring (really diamond-shaped) of lymphoid or tonsillar tissue, protecting the upper respiratory tract from infection. This "Waldeyer's ring" is made up of the pharyngeal tonsil above, in the rhinopharynx, the lingual tonsil below, between the base of the tongue and the lingual surface of the epiglottis, and the faucial tonsils, one at either side of the pharynx, between the pillars of the fauces. It may be well to emphasize, in passing,

that they regarded these structures as protective, though they are seldom so treated in these days. In common with other glandular structures elsewhere in the body, these groups of lymphoid tissue are peculiarly active physiologically in the years from birth to the 15th or 16th year. During this period, in response to physiologic calls, they are frequently congested and engorged, but generally return to normal soon after; and ultimately, by the time puberty is attained, they have atrophied to negligible masses. Such is the life cycle of these structures in health, and I go into it at this length as I wish to establish the reasonable belief that the presence of lymphoid tissue in the epipharynx, even congested, may be perfectly normal, and when so found by the exploring finger, or seen by the mirror, is not necessarily to be removed as causative of an abnormal condition, the origin of which the attendant cannot otherwise account for.

The widely prevalent belief among some of the profession and many of the laity that difficulty in nasal respiration in children is pathognomonic of adenoids has led to many unnecessary operations and unsatisfactory functional results. My opinion is the gradual growth of an experience covering observation of hundreds of cases in the hospitals and my own office, where I have seen children arrive with the diagnosis already made, either by the parent or by the doctor referring the case. Thus, I have come to adopt the routine of asking: "What makes you think an adenoid causes this difficulty?" And the reply is almost as routine as the question: "Because he sleeps with his mouth open, breathes through his mouth often, takes cold easily, sneezes so often, is restless at night"; or "the doctor says he has an adenoid."

The presence of an adenoid can be more reliably determined by an examination, not of the nose or throat, but of the ear drum, though inspection of the former regions will, of course, frequently reveal its presence. This is my own belief, an opinion I have not seen stated by anyone else, and is based on my firm feeling that no mass of lymphoid tissue in the epipharynx of a child can be so large, or so placed when small, as to require removal and not cause in the light reflex and position or color of the drum head an easily recognizable change when under inspection at the hands of a skilled aurist. On the other hand, frequent colds, mouth breathing, restless sleep, free nasal mucous discharge, though classical symptoms, are not sufficient grounds for a diagnosis of adenoids. It is true they are highly suggestive and frequently the result of adenoids, yet I have seen one child, with only the normal amount of lymphoid tissue in the rhinopharynx, show all these signs in the most distressing degree, and recover completely when he was denied soda crackers to which he had had access for several weeks. As often as he surreptitiously partook of this usual

\* Read before the Medical Society of the District of Columbia, Washington, D. C., March 21, 1917.

ly simple diet, all the symptoms would return. This is an example of perhaps the most frequent cause of false adenoid symptoms, and is due to a nasal reflex from gastro-intestinal irritation, of which I have seen a fairly large number in consultation, though in few was the cause so simple and the relief so prompt.

It may be contended that all this uncertainty could be readily removed by a digital examination, and I admit that this impression is as general as it is misleading, for many reasons. Bearing always in mind that the mouth and rhinopharynx of children are very constricted, that the examination is painful if not actually brutal, even where the child is submissive, and that the fingers of many are too short to reach easily the part to be palpated, it is not hard to believe that such an examination might be inconclusive. Add to these natural difficulties, the further complication of struggling, and most do struggle valiantly, this method of examination is no longer the simple, efficient diagnostic measure commonly recommended. Thus, I believe that under the peculiar difficulties surrounding such an examination, which must be brief and even fleeting, the finger cannot give definite information as to the location or size of the mass, and these two points are the prerequisites for a proper diagnosis. It is not sufficient to say that the examining finger detects a lymphoid mass, as that fact was known before examination, which should determine the location of the mass and its size, as these two details constitute all the difference between necessity for operation, and necessity for non-operative treatment for the symptoms. Moreover, I have seen at least one case infected by the nail of the examining finger, and this one illustrates both of the points I have tried to make clear,—its fallibility on the one hand, and its reliability on the other, of the ear examination. Basing his conclusions on the digital examination, a laryngologist of great experience and very deft fingers made the definite report of no adenoids; as he infected the patient in the process, it is to be assumed that he was thorough in his manipulation. I reported that an obstructive adenoid existed, basing my belief on a retracted drum on each side. One month later a large adenoid was removed. I have abandoned the digital method since the first two years of special practice, and have not made such an examination for ten years at least. However, under an anesthetic this method is of great value, and is the only way we have of determining the extent of the mass to be removed. When the palate is retracted we can make a leisurely inspection with the finger which will reveal everything that we need to know, size, location and structure.

An unusual condition that led me twice to a faulty diagnosis was an extension of the vomer back to the pharyngeal wall to which it was firmly adherent. It was covered with a degen-

erated, polypoid membrane that gave a perfect picture of an adenoid in the mirror, but the instant I examined it with my finger under an anesthetic, preliminary to removal, its nature became apparent. A diagnosis by inference is perfectly reliable, as any process that will cause enlarged and diseased faucial tonsils will similarly and simultaneously cause disease in the pharyngeal member of this lymphoid family, and no examination is necessary.

While such an error seems elemental, yet often a child is said to be in need of an adenoidectomy, whereas the adenoid is merely temporarily engorged from a recent cold, and subsides soon after. The effects of a coryza in causing a hypertrophy of the pharyngeal tonsil persist much longer than the nasal condition, easily two weeks, and at times in the poorly nourished, a month after cessation of the nasal engorgement and inflammation. This is the reason that repeated attacks of adenoid inflammation lead to permanent hypertrophy, as there is little time between the actual engorgement of the adenoid before another acute attack follows. Thus the practically chronic inflammation of the tissue leads, as it does elsewhere, to a fibrous condition, and the necessity for operation. Failure to take into account this temporary enlargement is a very frequent cause of faulty diagnosis, and was the immediate cause of error in a case recently seen by me. Not only did the adenoid hypertrophy disappear, but even the faucial tonsils resumed the normal; nevertheless, the boy continued to breathe with difficulty during the day through his nose, and at night not at all through it. This led the original examiner to insist all the more on his previous diagnosis, but, later, when asked to examine the child, I found that the nares were completely blocked with the characteristic crusts and thick tenacious mucus of atrophic rhinitis. Systematic removal of these masses and appropriate treatment have cleared up all his respiratory condition.

The blocking of the nares by growths such as polypi and fibromata, especially when they present in the rhinopharynx, is one of the less frequent causes of mistaken diagnosis, though I have seen three such cases where the latter were at the bottom of the trouble. One of these cases had already been operated upon, naturally without relief, and another I saw for the first time on the operating table, where I was asked to operate at the conclusion of another operation on this patient. On lifting the soft palate a hard, glistening, elongated tumor was seen, a fibrosarcoma in all likelihood. This was the mass that had been diagnosed as an adenoid, especially as there was also difficulty in nasal respiration!

Failure to force children to evacuate their bladders at bedtime, or allowing them to drink much fluid at the evening meal, resulting in the same distention of the bladder, occasionally leads to intumescence of the turbinates, par-

oxysmal sneezing, mouth breathing and restless sleep. A reflex in the nose similar to that seen in those cases exhibiting the connection of the sexual apparatus with the nose is the cause here. Chronic constipation acts in the same way, but also creates its effects through the channel of disturbed metabolism dependent on the auto-intoxication.

Perhaps the most interesting cases, where we think erroneously that an adenoid is causative of the respiratory distress, are those with an anaphylactic affection, chiefly for eggs and milk, resembling the class I have referred to as due to gastrointestinal irritation, though etiologically quite different. I have seen many times children exhibit all the symptoms we regard as classical of adenoid obstruction (except the adenoid itself) after eating eggs in some form, and to a less degree, milk also.

In all these cases, whatever the cause, the nasal obstruction and the paroxysmal sneezing are due to the intumescence of the turbinates which may reach an enormous distention in a few moments, only to subside in 15 or 20 minutes, to recur about two or three hours later. There is so much less discharge of mucus than in coryza, and the struggle for nasal breathing is so fierce that it is striking how soon the child returns to quiet, peaceful sleep, pending the next exacerbation. This picture is typical, and almost constitutes, in the points enumerated, a means of differential diagnosis; nor is this characterization fanciful. I have studied one case for two years, during which time he has had many colds, and I have had ample opportunity to compare the two types of respiratory distress in his case, as well as in numerous others. Children who have had acidosis seem peculiarly liable to this trouble, and the diagnosis is here especially important, for obvious reasons.

I have come to the conclusion that an experienced pediatrician should be fully as capable of making a diagnosis of adenoids as any laryngologist, and certainly each can be of great service to the other in determining the cause of the respiratory disturbances to which children seem especially liable in the temperate zone. Moreover, in view of the prominent part played by metabolism in the causation of false adenoid symptoms, and the importance of proper diet in childhood, cooperation is again most desirable.

In conclusion, I would like to summarize the important points in connection with the foregoing remarks: Full bladder at night, chronic constipation, anaphylaxis, gastrointestinal irritation, nasal growths, blind reliance on digital examination and posterior rhinoscopy (whether with mirror or nasopharyngoscope), reliability and delicacy of the test of drum inspection and the wisdom of examining when all inflammatory conditions have definitely disappeared.

## A NOTE ON BÁRÁNY'S SIGN IN EPILEPTICS AND IN SCHOOL CHILDREN.

By EDWARD A. TRACY, M.D., BOSTON.

BÁRÁNY'S sign is conjugate deviation of the eyes, when closed, to the right or to the left. It indicates supranuclear increase of tonus. In 50% of hemiplegics there was found conjugate deviation of the eyes toward the paralyzed side, *i. e.*, away from the side of the brain lesion. In cases of fresh hemiplegia, there was conjugate deviation toward the side of the brain lesion. In one-third of the cases of epilepsy examined, conjugate deviation of the eyes was found present, and the eyes looked toward the side of the brain lesion, when one was present.\*

Through courtesies extended by Professor Southard of the Harvard Medical School, and Drs. Flood, Thom and Hodskins, the writer examined fifty patients at the Monson State Hospital for epileptics. Bárány's sign, conjugate deviation of the eyes, was found present in 23 of these cases, the conjugation pointing to the left in 13 of them and to the right in 10.

In a case of epilepsy treated by the writer, in which observations were made for a period of several months, the condition of conjugate deviation of the eyes to the left—noted at various times during two months—changed to the normal condition of divergence and remained so up to the time of writing—a period of two months. During this latter period observations were made twice daily. In this particular case the writer has findings that indicate lesions on each side of the cerebrum—the more extensive lesion being in the left cerebrum. Bárány's sign, when present, pointed toward the left side.

In two patients at the Monson State Hospital who were examined at intervals of six months: in one the condition of conjugate deviation to the left, noted at the first examination, changed to the condition of divergence (regarded by Bárány as a normal condition), and in the other patient the condition, noted at the first examination, of convergence (regarded also as normal by Bárány) changed to the condition of conjugate deviation to the left.

These observations prove that Bárány's sign, when found in epilepsy, is not constant.

In the ordinary course of practice, the writer found several individuals, apparently normal, with conjugate deviation of the eyes. To determine the frequency of such cases, 478 school children between the ages of eight and fourteen years, were examined. In 191 of these children, conjugate deviation of the eyes was observed.

### CONCLUSIONS.

Bárány's sign, conjugate deviation of the eyes, is frequently present in epilepsy. It is not constant in epilepsy, when found. It is not rare in apparently normal children.

\* Transcribed from personal notes taken during course of instruction given by Bárány, in Vienna, in 1914.

### Book Reviews.

*Pye's Surgical Handicraft.* A Manual of Surgical Manipulations, Minor Surgery, and Other Matters Connected with the Work of House Surgeons and Surgical Dressers. Edited and largely rewritten by W. H. CLAYTON-GREENE, B.A., M.B., B.C. (Camb.), F.R.C.S. (Eng.); Surgeon to St. Mary's Hospital; Lecturer on Surgery in the Medical School, etc. Seventh edition. Fully revised, with some additional matter and illustrations. *Vel de minimis curat chirurgicus.* New York: William Wood and Company. 1916.

The seventh edition of the well-known English book, *Pye's Surgical Handicraft*, is a volume of medium size, about 600 pages, and very well illustrated with some 350 cuts and plates. In the preface, Mr. W. H. Clayton-Greene says: "The seventh edition of this work carries out the features of its predecessors. Most of the chapters have been revised, and some have been rewritten." Glancing through the volume, we notice less than a page upon the very important subject of local anesthesia, an amount of space unquestionably insufficient and out of proportion in a volume of 600 pages. Much of the apparatus pictured is a little strange to American eyes, but will probably be more familiar to us in the future as a result of the present war; even though many of the appliances appear somewhat old fashioned, it will be beneficial to the American surgeon in helping him to remember that so-called modern innovations are not necessarily either new, or improvements upon methods already subjected to the severe test of actual use. The type, paper and binding of the book are good.

*A Laboratory Guide in Pharmacology.* By TORALD SOLLMANN, M.D., Professor of Pharmacology and Materia Medica, Western Reserve University, Cleveland, Ohio. Octavo, 355 pages, illustrated. Philadelphia and London: W. B. Saunders Company. 1917. Cloth, \$2.50 net.

This work is clearly written by an authority in this line of medical knowledge. It is made up of two parts, one of which pertains more distinctly to pure pharmacology, associated with toxicology, while the second comprises, more particularly, applied therapeutics, as derived from experiments on animals.

The second division appeals, particularly, to medical men on account of the intimate knowledge which it imparts of the action of drugs upon the various organs of the body. This,

hitherto, has been taught largely by demonstration and didactic lectures on the part of instructors. But one can appreciate the vastly greater knowledge which the student acquires, either alone or in groups, in the actual performance of these experiments upon animals.

A wise provision has been made by the author in dividing these experiments into required and optional ones, whereby the more essential and important are necessarily performed, while others may be omitted, if time limits.

The exactness with which laboratory material, apparatus and distribution of groups of students in the performance of these experiments is described, can be heartily commended.

On the whole, the work is somewhat ahead of what the majority of medical schools can at present carry out, but to which they must all aspire.

*A Manual of Otology for Students and Practitioners.* By CHARLES EDWIN PERKINS, M.D., F.A.C.S., Professor of Clinical Otology in New York University and Bellevue Hospital Medical College; Associate Aural Surgeon to St. Luke's Hospital; Assistant Aural Surgeon, New York Eye and Ear Infirmary; Fellow of the American Otological Society, etc. Illustrated with 120 engravings. Philadelphia and New York: Lea & Febiger. 1916.

Perkins' Manual of Otology is a handy volume of 445 pages. There are 120 illustrations. The book is well and attractively printed, and the paper is exceptionally good. The aim of the writer, who has had a large teaching experience, is to enable the undergraduate and the post graduate, who is to make otology a specialty, a capable aurist. He says, "Careful adherence to the technic advised, with due attention to the measures indicated to avoid dangers and accidents, will insure the surgeon becoming a safe and efficient operator." This is making large promises. Further on in the preface the writer states, "The Chapter on Suppurative Diseases of the Labyrinth sets forth the present knowledge of the graver affections of this complex region. It is hoped that this part of the subject has been presented in so clear and definite a manner as even to bring it within the easy grasp of the beginner." Omit the word "easy" and this somewhat self-satisfied statement is true. The chapters on the labyrinth are among the most direct and the best in the book.

The book is concise, and unusually fresh and snappy. It is also pleasant reading, which cannot be said of all hand-books.



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## MASSACHUSETTS MEDICAL SOCIETY.

THE one hundred and thirty-sixth anniversary meeting of The Massachusetts Medical Society was duly observed on Tuesday and Wednesday of last week, June 12 and 13. The hospital clinics, the meetings of the several sections, and the annual meeting were successfully held in accordance with the program announced in the issue of the JOURNAL for June 7, and were attended by over seven hundred members. All the papers scheduled were presented, though some of the authors and discussers were absent on military service. At all the meetings references to the war and to the circumstances created by it in this country gave a characteristic tone to the proceedings.

Particular attention is directed to the text of the Shattuck Lecture by Dr. Walter B. Cannon, published in full as a leading article in the present issue of the JOURNAL. Dr. Cannon's work, a scholarly contribution, represents his amplification of the research initiated and the suggestions made by Dr. William T. Porter as a result of his experiences at the European battle front in 1916. Dr. Porter's original papers

and valuable conclusions on the important subject of shock have been published in the JOURNAL during the past winter.

At the annual meeting on June 13, the following officers were elected for the ensuing year:

Dr. Samuel B. Woodward, Worcester, president; Dr. George P. Twitchell, Greenfield, vice-president; Dr. Walter L. Burrage, Boston, secretary; Dr. Arthur K. Stone, Boston, treasurer; Dr. Edwin H. Brigham, Brookline, librarian; Dr. Myles Standish, Boston, orator.

The annual dinner was held at the Copley-Plaza Hotel on the evening of Wednesday, June 13, and was attended by over four hundred members. Among the after-dinner speakers were Lieut.-Gov. Coolidge, Major F. F. Simpson, Major Horace D. Arnold and Dr. Allan J. McLaughlin, Massachusetts State Commissioner of Health. Dwelling chiefly upon the medical situation in the war, Dr. McLaughlin emphasized on the one hand the urgent need of surgeons in the Medical Reserve Corps, and on the other, the desirability that medical students should pursue their professional studies in order to fit themselves as speedily as possible for the care of the civilian population, thereby relieving older men for service in the field. Bishop Lawrence discussed the menace of alcohol and of venereal disease both to soldiers and to the community at large, and urged united effort on the part of physicians to prevent and control both evils. President Lowell of Harvard, the closing speaker, explained the purposes of the League to Enforce Peace, and urged that we be not found unprepared for peace as we were for war.

"It is a mistake to consider that we have entered this war to force our ideas of democracy on Germany or any other nation that does not like them. We are at war because we will not allow Germany to force her ideas of government upon us and upon the rest of the civilized world. If she likes her form of government and will hold her scepter in peace, there is no desire or inclination in the United States to interfere."

Dr. Samuel B. Woodward, presiding at the annual meeting and at the dinner, spoke and introduced other speakers with his customary ease of manner and happiness of expression. The serious atmosphere which pervaded this first war session of The Massachusetts Medical Society, it may be hoped, has impressed all physicians with the seriousness of our national situation and with the duty of physicians in

meeting their important share of its emergencies and responsibilities. The circumstances and changes that may develop before another year elapses cannot be foreseen, but that the Massachusetts profession at its meeting in 1918 can look back with honest credit upon its share of service may be confidently predicted.

#### THE RÔLE OF THE INTERNAL SECRETIONS IN THE FEMALE FUNCTIONS.

In the light of modern investigations the part that the internal secretions are playing in all the body functions is assuming greater proportions every day. Not only are they in entire control of many physiologic functions, but they control them by a system of antagonistic actions. Their activities are tonic or trophic to a large degree, and directly influenced by the vegetative nervous system. Disease or disturbances in function of one of the glands may throw the whole endocrinous system out of harmony, and are manifested clinically by pathological symptoms in the parts controlled. The harmonious balance may, however, be restored, even without the restoration in the gland affected, by a sort of compensatory activity or inhibition in the other glands of the system. Certain physiologic functions are the especial charges of certain of the endocrinous glands or of certain systems of glands, but there is an inter-relation between the whole series of endocrinous glands throughout the body.

The glands which are intimately associated with the development and with the tonic or trophic integrity of the female genital system are the ovary, the thyroid gland and the hypophysis. Besides producing the ovum, the ovary exerts the main trophic influence upon the genital organs. It influences the shape of the pelvis, the development of the mammary glands, and the character of the voice. Its influence is particularly evidenced in respect to the menstrual epoch. The internal secretion of the ovary thrown into the general circulation acts specifically on such mucous membranes of the body as those of the nose and pharynx, but especially upon the membrane lining the uterus. There is a hyperaemic condition through the entire body, and vicarious menstruation is not an abnormal condition at all, but rather a manifestation unusual in degree. It is the relief of the congested capillaries of the uterus by the bleeding that constitutes menstruation, as ordinarily conceived.

The association of the thyroid gland with the sexual apparatus is well known. It is intimately associated with the vegetative nervous system, and is no doubt concerned in the various nervous manifestations during menstruation and in disturbances of menstruation. At any rate, thyroid disturbances are about ten times as common in the female as in the male.

The hypophysis is probably the most important factor in the nutrition and in the maintenance of tone in the sexual apparatus. Disturbances in this organ are very ready to act adversely upon the ovarian function, with respect especially to the latter's trophic activities. The posterior lobe of this organ secretes a substance known as pituitrin and has a specific function in the production of term labor. The extract is used medicinally to accelerate labor at term, when, for some reason, the action is inhibited. Moreover, disturbances in hypophyseal action, especially as regards the posterior lobe, may inhibit the breaking through the Graafian follicle of the ovum. In this ovulation cycle the ovary maintains the activity of the tubal cilia in their function of driving the ovum into the uterus. The thyroid contribution to this function lies probably in the stimulation afforded these cilia in their activity.

Menstruation occurs in the female because the ovarian secretion provokes this general and uterine congestion in which bleeding follows the climax in the most affected of the membranes, that of the uterus. In association with this period the ovum is thrown off from the Graafian follicle. If no fecundation takes place only a scar is left in the place of the follicle. If fecundation does take place the follicle gives rise to the formation of a new body or organ, the corpus luteum or yellow body. The impregnated ovum gives off a secretion which tends to antagonize and to nullify the ovarian secretion purposed to produce the menstrual congestion. The corpus luteum itself becomes an organ of internal secretion, assuming a part in the trophic control of the functions concerned. During pregnancy there is effected a structural change in the anterior lobe of the hypophysis and an inhibition in the action of the posterior lobe. At term, as a result of the activity of the various internal secretory organs, there is a break in the balance heretofore maintained between the hypophysis, the ovary and the placental tissue, as well as the corpus luteum, which acted to inhibit menstruation. Labor,

then, really becomes a restored menstruation, and is brought about particularly by the restored reactivity of the posterior lobe of the hypophysis. Up to this time the inhibition on this gland is so strong that the injection of even large amounts of pituitrin extract will have no effect to bring on labor, while at labor even minute amounts of pituitrin have a remarkably specific action. Pituitrin not only has a direct action on the uterus, but it acts to stimulate the gland itself.

#### MEDICAL REMINISCENCES OF WATERLOO.

In an issue of the *Edinburgh Medical Journal*, quoted in a recent number of the *British Medical Journal*, were published extracts from a report of observations made in the British Military Hospital in Belgium after the battle of Waterloo, by John Thomson, the first professor of military surgery at Edinburgh University. Dr. Thomson went with Dr. Somerville to Belgium, where he arrived about three weeks after Waterloo, on July 8, 1815. He visited the military hospitals at Brussels, Antwerp and Termonde, where his experiences present many points of interesting comparison with those reported by surgeons visiting the same localities a century later. The relative magnitude of military operations in the Napoleonic era and at the present time is forcibly illustrated by the number of wounded soldiers to be dealt with:

"The official estimate of the number of wounded on June 16 and 18 was 8,000; those who could not be accommodated in Brussels were sent by canal to Antwerp. Several thousands of French wounded had been left on the field, and these were sent to Antwerp and Termonde. Thomson has a good deal to say about 'symptomatic fever,' which 'put on much of the appearance of a bilious remittent or continued fever,' and which began to prove fatal by the seventh day after the battle, and continued to be so till the twenty-first day, when the number of deaths suddenly diminished. The hospitals of Brussels and Antwerp were free from contagious fevers, a fact which Thomson attributes to the great attention paid in the British hospitals to cleanliness and ventilation and 'to the habits and discipline of our troops with regard to personal cleanliness.' Hospital gangrene, when once it had gained a footing in a ward, spread with considerable rapidity, but it is somewhat surprising to read that Thomson was doubtful as to its being communicated by one patient to another, and was inclined to be-

lieve that it was 'endemic and dependent on the same causes as the fevers of the country.' The number of cases of tetanus was inconsiderable, but the disease was of a chronic or mild type, 'a form of tetanus in which recovery often takes place without much aid from medicine.' As to gunshot wounds, Thomson says: 'No fear is now entertained, either by medical men or soldiers, of any kind of poison being introduced into the body by means of musket balls. All the consequences, immediate and remote, to which these balls give rise, are justly referred to the contusion, laceration and division occasioned by their impulse. Accordingly surgeons now no longer think it necessary to dilate, cauterize, or suck such wounds for the purpose of destroying or extracting poison.' Gunshot fractures of the femur were then, as now, a source of great anxiety to the surgeon. Various attempts were made to apply continuous extension, but apparently without much success. Secondary hemorrhage was frequent and usually occurred from the twentieth to the thirty-fifth day. Thomson concludes with a warm tribute to the humanity shown by the inhabitants of Brussels and Antwerp to the British wounded. Even after the hospitals were fully established, several hundreds were voluntarily received and taken care of by the inhabitants. Sir Charles Bell also hurried off to Brussels after the battle. He was accompanied by his brother-in-law, John Shaw, afterwards surgeon to the Middlesex Hospital. The only passports they had were surgical instruments, which Shaw shook in the faces of the officials; these credentials passed them. On July 1 Bell writes: 'It was thought that we were prepared for a great battle, yet here we are, eleven days after it, only making arrangements for the reception of the wounded.' He offered to perform all the capital operations on the wounded French. He was much struck by the appearance and 'capacity of adaptation' of Napoleon's soldiers. 'These fellows,' he writes, 'are brought from the field after lying many days on the ground, many dying, many in the agony, many miserably racked with pain and spasms, and the fellow next to him mimicks him and gives it a tune. Ah! ha! vous chantez bien!' After his return Bell wrote to his friend Francis Horner that he took the knife in his hand at six o'clock in the morning, and 'continued incessantly at work until seven in the evening; and so the second and third day. All the decencies of performing surgical operations were soon neglected. While I amputate one man's thigh there lay at one time thirteen, all beseeching to be taken next; one full of entreaty, one calling upon me to remember my promise to take him, another execrating. It was a strange thing to feel my clothes stiff with blood, and my arms powerless with the exertion of using the knife! And more extraordinary still, to find my mind calm amidst such variety of suffering.'"

## A FRENCH SURGEON AND POET.

AN item in the issue of the *Lancet* for December 9, 1916, calls attention to some notes recently presented before the French Academy by M. Antoine Thomas on the life of Jean Pitart, a thirteenth century Parisian surgeon and poet, referred to in Puccinotti's "*Storia della Medicina*."

"The date and place of Jean Pitart's birth are unknown; probably he came from Normandy, and the close intimacy between him and Henri de Mondeville confirms this view. François Quesnay says he died, age 77, in 1315, but there is evidence that he was alive in 1325, because in that year the Comte de Valois in his will bequeathed 50 livres to Pitart.

The first authentic record of Pitart is at Paris in 1292, when he pays 20 sous as an impost as a resident in the Rue Neuve Notre-Dame. By 1298 he had risen to the rank of court surgeon, for in that year he was in receipt of fees as such from Philippe le Bel. In 1303 he accompanied Philippe 14 to the south of France, for an account of royal expenditure at Toulouse shows that, for 40 days' service, he was paid 7 livres 13 sous and certain apparel. In 1308 he was with Robert d'Artois at Conflans, and in 1312 he went to Artois to attend a certain countess, doubtless successfully, for he received for his services on that occasion no less than 100 livres, a large honorarium in those days; also robes for himself and Madame Pitart. He continued to be the royal surgeon under Louise X and Philippe V, for the latter presented him with property at Cotentin and elsewhere. Finally, in 1327, Charles IV calls him his '*dilectus chirurgicus*' in an act giving Pitart further emoluments.

Pitart's decease seems to have occurred at the end of 1328. An interesting event in his long career was his appointment as president of a committee decreed in 1311 by Philippe IV to inquire into the irregularities occurring in the surgical profession in Paris. The committee were empowered to register those persons worthy of exercising the duties of the craft, which had been usurped without any proper qualification by many barbers. These amateurs had been rounded up by Etienne Boileau, Prefect of Paris, in 1301, when 29 of them were prohibited from practising unless they passed some examination. Pitart probably had a hand in preparing the preamble of the edict promulgating the commission, for, as will be seen from the quotation, it condemns the abuses arising from the actions of uneducated persons, whilst flattering the citizens of Paris upon the erudition of its true scientists:—

'Ne in villa Parisiensis, quae proprie locus est fluentissimi fontis scientiae, quae etiam scientes pavit et, in utero recipiens ignorantes,

tandem suae fontis sapientiae germinosis rigatos rivales diversarum facultatum reddit scientiis insignitos, talia de cetero perpetrentur.'

M. Thomas designated Pitart a poet, one proof of his capacity in that profession being four lines of verse inscribed upon a well which he had caused to be dug in the Cité quarter of Paris; this was still in existence in the seventeenth century. The distich ran as follows:—

Jehan Pitard en ce repaire,  
Chirurgien-le-roy, fit faire  
Ce puits en (l'an) mil trois cent dix,  
Dont Dieu lui doint son paradis.

Pitart excavated the well to prevent the neighbours drinking the dangerously polluted Seine water, and obviously considered the work meritorious. M. Thomas is also satisfied that Pitart wrote a poem, '*Le Dit de Bigamie*,' in which he refuted the views of those who held that a widower who re-married was a bigamist. Jean Pitart appears to have been a man of sound sense as well as of learning which was eminent in its day."

## MEDICAL NOTES.

STATE WORK AGAINST INFANTILE PARALYSIS. —The Institute for Public Service of New York City has published a book called "*State Work Against Infantile Paralysis*" which is a record of the efforts made by forty-three state health departments and the United States Public Health Service to control and prevent epidemics of infantile paralysis. In a foreword Dr. Charles Bolduan, director of the New York City Bureau of Health Education, states: "The information here collected by this Institute for Public Service will prove invaluable to health officers throughout the world. Not one of them, even the most experienced, but will find in this compilation some useful suggestion which will facilitate his work. Moreover, the bringing together, as is here done, of the procedures followed in different cities and states should do much toward the introduction of standard methods and the adoption of uniform regulations."

REPORT OF INFANTILE PARALYSIS COMMITTEE. —A special committee formed for the purpose of conducting an inquiry into the causes and prevention of infantile paralysis, have made a report to Mayor Mitchell which gives the results of a study of 5496 cases. It asserts that "slight and non-paralytic cases are the most frequent sources of infections," as these cases arouse no suspicion and other persons come in contact with them; that the disease usually develops from 5 to 10 days after exposure, and that "previous good health does not give immunity from attack."

The report says males are apparently more susceptible than females. Parents are urged to



isolate sick children, the report holding that this precaution and early diagnosis of infected cases are of the greatest importance in preventing spread of the disease.

**SOCIAL INSURANCE.**—At the annual meeting of the American Medical Association the subject of social insurance was brought up, and the committee chosen to investigate and present a report on this question expressed itself in favor of both old age pensions and social insurance. The report stated:

"The fact that a very large portion of our working population earns only the necessary amount for a decent existence, and in many cases the earnings are below the minimum for the support of the family, has been repeatedly established by numerous investigations. The increase in activity of numerous charitable agencies—public and private—is sufficient evidence that wage conditions alone in this country are unable to cope with the grave problem of destitution."

Referring to the compulsory insurance laws in England, the report said: "One noticeable effect was the enormous amount of unsuspected sickness that it brought to light, especially among the women."

"These women had been unable to stop their work and properly care for themselves, but had to drag on half sick, struggling with their work," it added. "Physicians working among them were surprised at the amount of real illness which came to light when these people, by right and not by favor, could go to a physician and ask for proper care."

#### WAR NOTES.

**RED CROSS UNITS ABROAD.**—The safe arrival in England is announced of the Chicago base hospital, the last of the six American Red Cross units ordered abroad. A message from Mrs. Whitelaw Reid of London to Miss Mabel T. Boardman, announced that the New York, Boston and Cleveland units had already gone to hospitals in France. There are, now, therefore, one hundred forty-four American physicians in Europe, with twelve dentists, 390 Red Cross nurses and 900 enlisted men of the Medical Corps, the first organization of the United States Army to go abroad.

**MILITARY PREPARATION IN NEW HAMPSHIRE.**—At a meeting of the Committee of American Physicians for Medical Preparedness, held in Concord, N. H., Drs. John M. Gile of Hanover, Charles R. Walker of Concord and Emdon Fritz of Manchester were appointed a committee to communicate with the physicians and dentists of the State with reference to an agreement as to the conservation of their practice during their absence on Government service.

Drs. Ernest L. Bell of Plymouth, James B. Woodman of Franklin and Daniel C. Norton of

Manchester were named as a committee on Red Cross ambulance units from New Hampshire.

Prof. Richard F. Husband of Hanover, Dr. William A. Young of Concord and Dr. W. T. Crosby of Manchester were named as a committee on publicity.

**AN INVESTIGATION OF THE HEALTH CONDITIONS IN THE NAVY.**—Secretary of the Navy Josephus Daniels has named a special committee, to comprise Dr. Abraham Flexner of New York, Dr. William H. Welch of Johns Hopkins and Nathan Straus of New York, to investigate health conditions in the navy. They will be given permission by Admiral Mayo, the commander of the Atlantic fleet, to investigate to the fullest degree and in their own way.

**MENINGITIS AT COMMONWEALTH PIER, BOSTON.**—The sixth case of cerebro-spinal meningitis has occurred at Commonwealth Pier. The patient came to the station recently from Providence and was removed to the Chelsea Naval Hospital.

Medical Director J. M. Edgar stated that none of the cases was contracted at the pier and that there was absolutely no cause for fear that there may be an epidemic of sickness.

The men who have been seized with meningitis include men from Chicago, Providence, Newport and Waltham, and the cases were discovered at different periods, May 8, 10, 16, 21 and 22. The time in which the men have been at the receiving station has not been of a length to allow the disease to originate here.

**MEMBERSHIP IN THE RED CROSS.**—An increase of 644,097 in the total membership of the chapters of the Atlantic division of the American Red Cross since April is reported. Returns from membership campaigns in various cities give the following results: Buffalo, N. Y., 50,000 members; Waterbury, Conn., 5000 members; Atlantic City, N. J., 5000 members.

**HARVARD AMBULANCE UNIT.**—An ambulance unit of thirty-nine men, made up of Harvard students and graduates, has been recruited and has left Cambridge to go into training camp at Allentown, Pa. Maj. E. E. Persons of the medical corps will supervise the training. Another Harvard unit is being formed and will follow the first unit.

**SUPPLIES NEEDED FOR BASE HOSPITAL No. 6.**—The ladies' visiting committee of the Massachusetts General Hospital has issued an appeal for contributions for emergency supplies for the hospital unit, United States base hospital No. 6, under the direction of Dr. Frederic A. Washburn. Mrs. John Lowell of Chestnut Hill is treasurer of the fund.

**SAFE ARRIVAL OF ORTHOPEDIC SURGEONS.**—The report of the safe arrival of Dr. Joel Goldthwait with the unit of twenty orthopedic surgeons has been received. He has reached England and will begin his tour of inspection of orthopedic hospitals in England and on the continent.

**WITHDRAWAL OF GERMAN UNIT.**—The unit of Chicago physicians which has been stationed at Graudenz, Germany, has left Berlin for Norway and thence back to America.

The expedition was financed by the German-Austro-Hungarian relief committee. It has finished its work and given the equipment brought from the United States to the Military Hospital at Graudenz. On leaving Norway Dr. Frederick Hagler of St. Louis, the head of the party, said:

"Throughout our stay in Graudenz we were given every courtesy by the civil and military authorities. In the last few months at no time were we made to feel that we were 'hostile foreigners.' Our leavetaking was not extremely cordial, but the authorities were prompt in facilitating our departure for Denmark."

**RAISING THE RED CROSS RELIEF FUND.**—Plans are under way for securing the \$100,000,000 war relief fund by the American Red Cross. The week of June 18 to 25 has been set apart by President Wilson, and fifty expert money campaigners have been sent out to all parts of the country from the headquarters at Washington. They will assist local Red Cross chapters and committees in organizing such work. The plans, as announced by the finance committee, require the formation of ten subscription teams in each city.

In New York a man-to-man canvass of the Wall Street district will be made by leading financiers, among whom are J. Pierpont Morgan, Jacob H. Schiff, Frank A. Vanderlip, Cornelius N. Bliss, Jr., A. H. Wiggin and Charles H. Sabin. Subscriptions running into the millions are expected to be forthcoming from New York.

**SCIENTIFIC AND ADMINISTRATIVE ACHIEVEMENT OF THE UNITED STATES ARMY MEDICAL CORPS.**—In the issue of the *Scientific Monthly* for May, 1917, is an excellent article by Lt.-Col. Champe C. McCulloch, Jr., Librarian of the Surgeon-General's Library at Washington, presenting a historical summary of the scientific and administrative achievement of the medical corps of the United States Army from its beginnings under Morgan, Shippen and Rush during the Revolution. There is a peculiar appropriateness in this paper at the present time and its perusal is particularly of interest to civilian physicians about to enter the Medical Reserve Corps and hitherto, perhaps, unfamiliar with the amount, variety and extent of work accomplished during the past century by the Army Medical Corps.

**PHYSICIANS CALLED TO ACCOUNT.**—It is reported from the Medical Bureau of the War Department that about fifty per cent. of the physicians who have enlisted in the Medical Reserve Corps, and who have accepted commissions, have failed to report for duty. According to the department officials many of the physicians who have reported have no idea whatever of discipline. The failure of so large a percentage of the doctors to report is causing much confusion in the bureau, which has held consistently that trained physicians would be needed as badly by the new national army as trained officers. Unless the absent physicians report immediately, drastic legal action will be taken by the department.

**IMMEDIATE NEED FOR SURGICAL DRESSINGS.**—Word has been received by the Surgical Dressings Committee of the Peter Bent Brigham Hospital, from Paris, that huge supplies of sterilized dressings are needed at once. Although the committee is working at top speed, not only at the hospital, but in its branches throughout New England to get dressings ready for the Allied wounded, it will make still greater efforts to increase the supply of dressings shipped weekly to France. Besides its splendid work for the Allied wounded, the committee has outfitted and is outfitting Massachusetts base hospitals with dressings and, in response to the call of the Massachusetts General Hospital, was able to get ready fifty-two cases in a few days. While the committee has enough volunteers, it needs money, that its fund may meet the constantly increasing cost of supplies, particularly gauze. The sum of \$20,000 is needed to keep up its work during the summer. Checks may be drawn to the Surgical Dressings Committee and sent to the Old Colony Trust Company, 17 Court Street.

**AMERICAN MEDICAL ASSOCIATION AND PROHIBITION.**—The recent meeting of the American Medical Association has been noteworthy for its clear and decisive stand on all medical matters pertaining to the military exigencies of the present day. Its broad and practical patriotism has been no better demonstrated than in its attitude toward prohibition. Dr. Charles H. Mayo of Rochester, Minn., newly elected president of the Association, in his address stated that the medical profession would welcome national prohibition, that the value of prohibition as a war measure is beyond discussion. Medicine has reached a period when alcohol is rarely employed as a drug, being displaced by better remedies. Alcohol's only place now is in the arts and sciences. Dr. Charles S. Stokes, a retired surgeon-general of the United States Navy, urged bone dry territory in the vicinity of army camps. Dr. Haven Emerson, commissioner of health in New York, stated that the nation requires today three times as much alcohol as formerly, but

needs it for munitions. Other speakers who urged prohibition were Dr. Ernest S. Bishop, Dr. John D. Quackenbos and Dr. Delancy Carter.

A resolution declaring alcohol entirely without merit, from a medical viewpoint, was presented to the house of delegates, the governing body of the association, yesterday by Dr. Frank Billings of Chicago, chairman of the Council of Health and Public Instruction of the association.

The resolution declared it to be the unanimous opinion of the council of health that alcohol had no drug value, either as a tonic or a stimulant or in any other therapeutic way, that it has no value as a food or in the treatment of disease, and that its only legitimate use in medicine is as a preservative and in the preparation of pharmaceutical products. The resolution was referred to a committee. After much discussion the committee passed the resolution in the following form:

"Whereas, we believe the use of alcohol is detrimental to the human economy, and whereas, its use in therapeutics as a tonic or stimulant for food has no scientific value; therefore, be it resolved, that the American Medical Association is opposed to the use of alcohol as a beverage, and be it further resolved, that the use of alcohol as a therapeutic agent should be further discouraged."

#### MEDICAL NOTES.

**WAR RELIEF FUNDS.**—On June 16 the totals of the principal New England war relief funds reached the following amounts:

French Wounded Fund ..	\$232,866.72
Permanent Blind Fund ..	116,363.15
French Orphanage Fund ..	109,974.57
Surgical Dressings Fund ..	97,375.97
Polish Fund .....	75,856.84
Italian Fund .....	42,077.87
War Dogs' Fund .....	600.25

#### BOSTON AND MASSACHUSETTS.

**WEEK'S DEATH RATE IN BOSTON.**—During the week ending June 16, 1917, the number of deaths reported was 227 against 199 for the same period last year, with a rate of 15.33 against 13.65 last year. There were 25 deaths under one year of age against 26 last year, and 71 deaths over 60 years of age against 67 last year.

The number of cases of principal reportable diseases were: diphtheria, 94; scarlet fever, 23; measles, 236; whooping cough, 11; typhoid fever, 3; tuberculosis, 71. Included in the above were the following cases of non-residents: diphtheria, 11; measles, 2; tuberculosis, 4.

Total deaths from these diseases were: diphtheria, 8; measles, 2; tuberculosis, 20. Included in the above were the following cases of non-

residents: diphtheria, 1; measles, 1; tuberculosis, 3.

**MIDDLESEX COLLEGE OF MEDICINE.**—The Middlesex College of Medicine conferred degrees on twenty-nine members of the graduating class. Exercises were held at the College Building, East Cambridge, Mass. Thomas Jefferson Boynton of the Suffolk Law School spoke on "Law and Medicine" and William Muss-Arnolt, former professor of Semitic languages at the University of Chicago, spoke on "College and University."

**MASSACHUSETTS ECLECTIC MEDICAL SOCIETY.**—The fifty-seventh annual meeting of the Massachusetts Eclectic Medical Society was held recently at Hotel Brunswick, Boston.

Dr. Harrie V. Dunsmore read a paper on "Gynecology," Dr. Charles A. Pratt on "Spinal Irritation," Dr. Fred W. Derby on "The Eye," Dr. Arthur J. Boucher, "Rheumatism," Dr. William H. Hills, "Florida for the Health," and Dr. Frederick G. Phillimore, on "Belladonna." Officers were also elected and installed.

**HEALTH DEPARTMENT OF BOSTON.**—In its recently published monthly bulletin (issue of April, 1917) the Boston Health Department announces that it has established a free vaccination station at 17 Blossom Street, near Cambridge Street, West End, where all persons residing in Boston may obtain free vaccination. The Bulletin urges increased care in health matters, especially in communicable diseases, particularly at this time when every effort should be made to conserve the health of not only the civilian but the soldier population who are dependent one upon the other. The guarding of the large mobilization camps from the ravages of venereal disease is a step that is most emphatically demanded.

**NATIONAL TUBERCULOSIS ASSOCIATION.**—At the annual meeting of the National Association for the Study and Prevention of Tuberculosis, held in Cincinnati, May 9, 10 and 11, the Boston Association for the Relief and Control of Tuberculosis, through its President, Dr. Arthur K. Stone, presented a vote from the executive committee of the association, urging the National Association to hold its next annual meeting in Boston. The Mayor of Boston has also written to the National Association, urging them to come to this city. The Cincinnati meeting was the largest ever held,—over 800 persons registering as in attendance.

**BABY HYGIENE ASSOCIATION.**—The Baby Hygiene Association reports that during the month of May it cared for 2330 babies. The Association is preparing for the heavy demand on its services expected to follow the mobilization of American troops.

**BABY CONSERVATION.**—A committee on the Conservation of Child Life has been appointed by Dr. Allan J. McLaughlin, State Health Commissioner, to intensify the methods of baby conservation, in view of the loss of man power by reason of the war. He believes that the best nucleus for baby saving is probably the milk station of a baby hygiene association, although with this station as a centre must be co-ordinated prenatal work with mothers, good obstetrical care, and continued supervision of the child until school age. The committee appointed is as follows:

Dr. David L. Edsall, member of the public health council of the State Department of Health, chairman; Dr. William J. Gallivan, member of the public health council of the State Department of Health, and Dr. Lyman Asa Jones, director, division of hygiene of the State Department of Health, recorder.

The consulting members are:

Dr. Fritz B. Talbot, pediatricist, chief of children's medical department, Massachusetts General Hospital; Dr. Richard M. Smith, pediatricist, assistant in pediatrics, Harvard Medical School; Dr. Walter Fernald, psychiatrist, superintendent of the Massachusetts School for the Feeble-Minded; Dr. William Healy, psychologist, director of the Psychopathic Institute of the Juvenile Court, Chicago, and Miss Mary Beard, director, Instructive District Nursing Association.

**PREVENTION OF INFANTILE PARALYSIS.**—Although the incidence of poliomyelitis in Massachusetts has been no more than normal, the State Department of Health is taking steps to prevent the onset of an epidemic such as occurred last summer. The department has issued a pamphlet for general distribution, stating the various theories of the method of transmission of the virus of poliomyelitis and urging that all exposed persons be quarantined for at least two weeks. Young children who show slight indispositions should be seen by a physician. Lumbar puncture and the administration of immune serum is advocated. Acute cases should be cared for in hospitals for the sake of both the patient and the community.

### Miscellany.

#### UNIVERSITY OF CHICAGO MEDICAL SCHOOL.

In a recent issue of the JOURNAL we noted somewhat incompletely the plan for the endowment of the Medical Department of the University of Chicago. In the issue of *Science* for November 17, appeared the following complete statement of this project and of the relations which it bears to the Rush Medical College.

"The General Education Board and the Rockefeller Foundation have appropriated \$2,000,000 (each \$1,000,000) for the establishment of a medical department in the University of Chicago. It brings Mr. Rockefeller's contributions to the university up to nearly \$37,000,000 funds for operation."

The university will set aside at least \$2,000,000 for the same purpose, will give a site on the Midway valued at \$500,000, and will raise a further sum of \$3,300,000. The medical school will therefore start with an endowment of almost \$8,000,000.

Rush Medical College, established seventy-five years ago, will go out of existence. The Presbyterian Hospital, which Rush College has used, will be taken over by the University of Chicago and will be reorganized to provide adequate clinical and laboratory facilities. A new laboratory building will be erected in immediate conjunction with the hospital. The buildings and grounds of the Presbyterian Hospital are valued at about \$3,000,000.

A statement given out by Dr. Abraham Flexner says:

This project will be giving the city of Chicago a high-grade medical school and it will also provide, for the first time in this country, a post-graduate school adequately equipped and financed.

The school will be erected on the Midway Plaisance, and will thus form a part of the present University of Chicago plant. High-grade modern laboratory buildings will be provided for instruction in the students' first and second years, and a university hospital under complete control of the university, with laboratories and an out-patient department, will be built on the Midway.

The entire teaching staff, clinical as well as laboratory, will be organized on the full-time basis. That is, all the teachers for clinical as well as laboratory studies will give their entire time to teaching and research in the university hospital and medical school. Professors and their assistants will hold their posts on condition that they become salaried university officials and that they accept personally no fees whatever for any medical or surgical services.

The only medical schools in the country today which have embraced the full-time teaching plan are Johns Hopkins Medical School and the medical department of Washington University, St. Louis.

The full-time scheme is a plan to insure to hospital work and medical teaching the undivided energy of eminent scientists whose efforts might otherwise be distracted by the conflicting demands of private practice and clinical teaching. The full-time scheme is an appeal to scientific interests and devotion of the clinician, and the results so far realized through the plan at Johns Hopkins have been most satisfactory.



It should be of increasing consequence to the public that the training of those studying to become doctors should be in charge of the most competent men obtainable, devoting their entire time to this work. Greatly increased efficiency and thoroughness should result, to the alleviation of suffering and the cure of disease.

The new institution thus to be established in Chicago will be equipped with every modern facility for medical instruction and with ample funds for operation.

In a later issue of *Science* was published the further following communication from a correspondent at the University of Chicago, relative to the endowment of the new medical school and descriptive of some of its plans:

"In outlining the plans and hopes of the University of Chicago at its recent quarter-centennial celebration President Harry Pratt Judson said that what was needed to complete a school of medicine at the university was provision for clinical work and a clinical staff at the Midway, and that in his judgment the first need was for a hospital wholly under the control of the university, for medical teaching and for medical research; and the second need was provision of adequate endowment, in order that the hospital itself might be beyond the necessity of being financed by income from its patients, and in order that the medical faculty might be free to pursue their work of investigation and instruction without recourse to personal practice.

In direct fulfillment of this hope and plan, the university board of trustees has just made one of the most important announcements in the history of the institution. The plan announced to be put into early operation provides for an undergraduate medical school, a graduate medical school and medical research. The first mentioned will be on the Midway Plaisance, in close connection with the science departments of the university. The standards of admission and of graduation will be as high as those of any medical schools in the country. The number of students will be limited to such as can receive the best possible training with the facilities available.

A teaching hospital, duly equipped with necessary laboratories and lecture rooms, will provide for clinical instruction. Suitable endowments will free the hospital from the necessity of depending on paying patients, and the faculty from the necessity of practice for a livelihood.

The graduate medical school will be on the west side, in connection with the work now done by the Rush Medical College and the Presbyterian Hospital. It will provide for medical graduates who wish further training and for practitioners who wish to keep in touch with progress in medical science. Research will be carried on in both places under the arrangements to be announced later.

The plan involves an addition to the resources of the university of the sum of five million three

hundred thousand dollars, one million for the hospital on the Midway, three hundred thousand for a laboratory on the west side and four millions for endowment.

Towards the endowment fund the Rockefeller Foundation offers one million dollars and the General Education Board one million dollars, provided the entire sum of five million three hundred thousand dollars shall be raised. Further pledges of individuals have been made to the amount of seven hundred thousand dollars. Thus two million seven hundred thousand dollars have already been secured. Two million six hundred thousand dollars remain to be secured and in the near future a campaign will be initiated to complete the fund.

In speaking of this announcement, which is probably the most significant that has ever been made in connection with higher medical education in Chicago, President Harry Pratt Judson says: 'The medical plans which have just been announced represent many years of hoping and working and dreaming. These plans, we think, will not merely be, when carried out, a great addition to the resources and power of the university, but will render a very valuable service to Chicago, and to the cause of medical teaching and investigation in the entire country.'

A later announcement is just made that half a million dollars towards this new medical fund for the University of Chicago has been given by Mr. and Mrs. Julius Rosenwald, of Chicago. Mr. Rosenwald, who is a trustee of the university and donor of the new Julius Rosenwald Hall devoted to the work of geology and geography, is one of the university's most generous and loyal friends; and Mrs. Rosenwald, who shares in this great gift, is widely known for her practical and constant sympathy with many movements for social and artistic advancement in Chicago.

At the meeting of the board of trustees of the university on November 14, the following committee was named to conduct the campaign for funds: President Harry Pratt Judson, chairman; Adolphus C. Bartlett, Dr. Frank Billings, Thomas E. Donnelley, Andrew MacLeish, Martin A. Ryerson, Julius Rosenwald, Robert L. Scott and Harold H. Swift."

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## SANITATION AND PUBLIC HEALTH IN SOUTH AMERICA.

In comparing public health conditions of South America and the well-cared-for portions of Europe and the United States, it is interesting to note, from recently published reports, that South America takes equal place. The countries of Brazil, Uruguay and Argentina can give as clean a bill of health as can the leading cities of the world.

The mortality statistics for Uruguay show that one-third of the deaths are of foreign-born persons, the Italians leading, with the Spaniards coming next and persons from adjacent countries last.

"In point of the saving of the babies, a matter in which Argentina has long been held up as a model, Uruguay presents the mortality figure of 11.5 per thousand births, the whole condition being comparable fairly well with that of a city in the United States which has given attention to this matter. An analysis of the figures of this mortality shows, what is a little curious, that more than one-quarter of the babies died from ill-defined or unspecified maladies. In number the total of these is about one-seventh of the ill-defined infants' deaths of this country, with its forty times greater registered population—a fact which shows that in Uruguay diagnosis has need of improvement, although for that matter there are portions of this country that are equally in need of improvement. As in the North, diarrhoea and enteritis stand as the largest cause of the death of babies—one-quarter of the total infantile mortality; broncho-pneumonia is the second cause, with one ninth of the whole, followed fairly closely by congenital troubles and by meningitis, with half as many for its toll as broncho-pneumonia.

Montevideo has a fairly high rate of mortality, sixteen to twenty being shown in the monthly returns, broncho-pneumonia disputing the highest place with consumption. Heart disease has not there yet asserted itself with the emphasis that characterizes the vital statistics of our country, being less deadly in general than apoplexy. The trimester under consideration—April to June, 1916—is in the cooler weather and shows no marked toll of infants, broncho-pneumonia being their greatest enemy. In mortality by races in Montevideo, the Italians show that lack of immunity which characterizes them in this country, and they furnish about one-sixth of the total mortality.

The application of sera is considerable in this South American city, amounting to 7000 to 10,000 cubic centimeters a month of anti-diphtheric vaccines, one-quarter as much anti-tetanic, an equal amount of tuberculin, mostly in testing cattle, while the anti-rabic service cares for five to seven persons each month."

Argentina is the centre for great immigration and the same condition holds true here as does in Uruguay, that Italians show less power of resistance than other nationalities, and comprise one-fifth of the number of deaths in the state. The Spaniards show a rate of about one-eighth.

"Next to tuberculosis, typhoid fever is the important infection, with a toll of forty a month, a rate of perhaps three or four times that of Boston. Tuberculosis has a rate in Buenos Aires of nearly one-half more than in Boston; broncho-pneumonia is in the autumn season much less serious than heart disease, infantile diarrhea, or tuberculosis, which is by far the

most deadly of the diseases in this country. It takes its place with cancer, brain congestion, meningitis and congenital debility as among the more important of the causes of death. Infantile mortality, which is one of the most widely discussed features of the Argentine vital tables, stands at about seventy per thousand births."

"In the mixture of races which the freedom of travel engenders, South America is less a melting-pot than this country, still it is making its mark on the population. In this important district in Argentina the mothers of the year 1914 were 63 per cent. Argentinian, 20 per cent. Italian and 9 per cent. Spanish, while the fathers were in the ratios 66 per cent., 23 per cent. and 8 per cent. Other South Americans, together with French speaking nations and Teutons, cut a very small figure here."

A compilation of vital statistics for Rio Janeiro has recently been issued by Dr. Enrico Rangel, director of the section of Demography of the Public Health Office. He states that in the district included, which contains nearly one million population, the mortality rate for the city is 20 and for the suburbs, 22.

"Half a century ago the mortality rate of Rio was about 50, and since that time it has been steadily decreased, till in 1898 the figure passed below 30; in 1908 below 25 and now it may generally be expressed as at 20. Some of the special years are indeed high, as in 1860 when it touched 71, while the downward progress was interrupted in 1904 and again in 1908 by outbreaks of smallpox which sent the figure up to unusually high ratings, 32, for example, in a period of 20 for the normal.

"To illustrate what this decrease means, Dr. Rangel presents a list of important cities in the world and in Brazil. In South America, against the notably high figure of Brazil at 20.85 per thousand of population, there is Callao, 44.43; Santiago, 39.64; Caracacas, 35.58, and Valparaiso, 20.47; in other tropical countries there are, Mexico, 40.58; Cairo, 36.90; Bombay, 33.06; Alexandria, 29.14; Calcutta, 28.13, and Manila, 23.82."

To show the progress of elimination of yellow fever, it is stated that in the five years 1909-13 there were twelve cases with ten deaths as compared with 1118 cases and 584 deaths in 1903 and a mortality of 4000 in 1850, and 3659 in 1873.

"The decline of typhoid has been rapid and steady, and from a figure of 14 per 1000 of population, in the early seventies, it dropped to 7 five years later, to 4 and 3 in the eighties and now its rate is about half a person per 10,000. Boston's rate in 1910, 1911, 1912 and 1913 was 1.16, .91, .97, and .82; while that of Rio for the same years was .55, .56, .56 and .83. Tuberculosis is not, however, so well in hand, for its rates are comparatively high. Although much lower than in earlier years, the figures since 1904 are all forties and do not show consistent decrease,

while for comparison those of Boston may be noted as 14 for 1913 against 44 of Rio.

This group of statistics is sufficient to suggest to those not having the opportunity to see the returns from the southern half of the world what the lines of sanitary advance are and what progress is being made by the great countries, some of which are popularly regarded with some apprehension in popular health discussions."

#### FIRST NATIONAL MEDICAL CONGRESS OF THE ARGENTINE REPUBLIC.

THE First National Medical Congress of the Argentine Republic was held in Buenos Aires from September 17 to 24, inclusive, 1916. About one thousand delegates from the City of Buenos Aires, the different Argentine provinces and from six of the South American republics, participated in the proceedings of the Congress.

The foreign delegates were from Brazil, Paraguay, Uruguay, Chile, Peru and Bolivia. The delegation from Brazil was composed of the following members: Doctors Aloysio de Castro, dean of the Medical College of Rio de Janeiro; Bruno Lobo, director of the Museum of Natural History and professor of microbiology; Samuel Libanio, professor in the Bello Horizonte Medical College, Minas Ceraes; Carlos Chagas, member of the Academy of Medicine; Oscar d'Utro Silya y O. Ribeiro da Fonseca, representing the Oswaldo Cruz Institute; Dr. Figuer do Rodrigues and Dr. Thompson Netto. Doctors Antonio Carina, delegate of the Faculty of Medicine of Sao Paulo, Vital Brazil, Olimpio da Fonseca, Jose Thompson Costa, Boaldo Cruz, Aragao, Sanotte, Cabazonne and Veyga. Paraguay was represented by Luis E. Migona, Tomás Bello and Luis Zenetti Cayosoni; Uruguay by Doctors Scosseria, Navarro, Ricaldoni, Morquio, J. Gonzalez, Hector Cobas, Juan S. Burnett, Rosello, Lacimur, Pujol, Dalger, Caminara, Brito Foresti and A. M. Oyuela, and others; and Chile by Doctors Amunategui, Maira and Sanhuesa; Peru by Dr. Eseciel, Dr. Sanchez Ascorbe; and Bolivia, Dr. Villazon and Dr. Juan M. Escalier.

The inaugural session was held in Colon Theatre on Sunday afternoon, September 17. Dr. Saavedra Lamas, Minister of Public Instruction of the Argentine Government, presiding. Dr. Gregorio Aráoz Alfaro of the City of Buenos Aires was unanimously elected President of the Congress, as were Doctors Carlos Bonorino Udaondo, Juan Carlos Navarro and Bernardo Houssey, secretaries.

In his opening address, among other things, President Gregorio Aráoz Alfaro said, in substance, that it was necessary to fix the scope and bounds of the Congress; that up to that time only scientific and international medical con-

gresses had been held in the country, but that the present Congress is genuinely Argentine; that its object is to investigate local conditions of sanitation and hygiene, and the study of the pathology and climatology of the Republic, with the object of placing the profession in Argentina on a level with the most advanced countries in the world in medical science. The President expressed the hope that this Congress would emphasize more and more the social mission of the physician, not only to cure but to prevent disease, and to strengthen and prepare the race for future generations of people more vigorous, healthy and happy than the present inhabitants of the land.

The business meetings of the Congress were held in the lecture hall of the medical college. About five hundred papers were presented for consideration. The work of the Congress was divided into sections, the principal of which were: Medical clinics and therapeutics, biology and pathology, obstetrics and gynecology, pharmacy and chemistry, general surgery, theory and practice of medicine, military sanitation, ophthalmology, odontology, pediatrics, dermatology, microbiology and laryngoscopy.

The Congress, which closed on the 24th of September, 1916, sanctioned the following recommendations:

The First National Congress of Medicine, realizing the great importance which the preservation of infancy has in every campaign against tuberculosis, recommends to the public authorities the following:

The founding of hospitals for the housing of children suffering with tuberculosis, the establishment at the seashore, on the plains or in the mountains, of sanatoria for treating children, who, without having outward signs of consumption, are of a delicate constitution, poorly fed and in danger of contracting the disease, and the adoption of prophylactic measures to protect the newly born and suckling babes of consumptive mothers.

The Congress recommended a thorough and critical revision of Argentine medical studies, for the purpose of securing a preponderance of important general studies, including in the curriculum the study of the history of medicine and its principles, comparative science and the genetics of evolution, general physiology and biology, and methods tending to increase the fund of medical knowledge. The board of directors of the Faculty of Medical Science of Buenos Aires is requested to take into consideration the plan submitted by the Faculty of the College of Dentistry concerning changing the present plan and decide same as early as possible.

The executive committee of the Congress was instructed to compile an index of medical bibliography.

A committee was appointed to choose the place of meeting of the Second National Medical Con-

gress. This committee selected Cordoba, Argentine Republic, in 1920, the exact date to be determined later. The following board of directors, consisting of physicians from the city of Cordoba, was appointed to arrange for the preliminary work and the holding of this Congress: Doctors Garzón, Maceda, Gomez, Martinez, Duceschi, Allende, Pitt and others.

The South American Association of Hygiene, Microbiology and Pathology of Buenos Aires, which participated in the First National Medical Congress, held its last annual meeting for the present year on September 25, 1916, under the presidency of Dr. Rudolph Kraus. At this meeting it was decided to hold in Rio de Janeiro, in 1917, a Conference of Hygiene, Microbiology and Pathology. Dr. Oswaldo Cruz of Rio de Janeiro was chosen President of said Conference.

#### UNITED STATES CIVIL-SERVICE EXAMINATIONS.

##### PHYSICIAN (MALE).

JULY 10, 1917.

The United States Civil Service Commission announces an open competitive examination for physician, for men only. Present and future vacancies in the positions of physician in the Indian and Panama Canal Services, acting assistant surgeon in the Public Health Service, surgeon and assistant surgeon in the Coast and Geodetic Survey, and in positions requiring similar qualifications in other branches of the service, will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer or promotion.

Certification for filling vacancies in the Public Health Service will be made of the highest eligibles residing in the vicinity of the place at which the appointee is to be employed, except that upon the request of the department certification will be made of the highest eligibles on the register for the entire country who have expressed willingness to accept appointment where the vacancy exists.

The applicant must have graduated from a medical school of recognized standing or be a senior student in such an institution and furnish proof of actual graduation within six months from the date of the examination. Additional credit will be given to competitors for physician positions in the Tropics, who have had special training in tropical medicine. Only persons who have had at least two years' experience in the practice of their profession since graduation will be eligible for appointment to the position of acting assistant surgeon in the Public Health Service.

The number of surgeons and assistant surgeons in the Coast and Geodetic Survey actually employed and under pay at any time is nine. Four of these are employed in Alaska and on the Pacific coast, four in the Philippines, and one on the Atlantic coast and in Porto Rico. Officers serving in the Philippines receive 20 per cent. additional pay and are usually relieved at the end of three years. All surgeons and assistant surgeons are attached to vessels; and while their first duty is to conserve the health of the crew, it is expected that they will take part in the work of the survey. Appointments will be confined to those who indicate in the personal question sheet of the examination willingness to accept service in any of the regions named.

Applicants must have reached their twenty-first birthday on the date of the examination, but eligibles who were more than 40 years of age on the day of the examination will not be certified except for filling vacancies in the position of acting assistant surgeon in

the Public Health Service, and eligibles who were less than 22 or more than 30 years of age on the day of the examination will not be certified for positions in the Panama Canal Service.

For positions in the Public Health Service and in the Coast and Geodetic Survey the medical certificates in the application form must be executed by an officer of the Public Health Service, except that when this requirement would work a hardship upon an applicant because of his distance from such officer he may have the certificate executed by any physician. In this event, however, he may be required to pass a physical examination before an officer of the Public Health Service before appointment.

Statements as to training and experience are accepted subject to verification.

This examination is open to all male citizens of the United States who meet the requirements.

Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C. Applications should be properly executed, including the medical certificate, but excluding the county officer's certificate, and must be filed with the Commission at Washington prior to the hour of closing business on July 10, 1917. The exact title of the examination, as given at the head of this announcement, should be stated in the application form.

##### ANATOMIST.

JULY 11, 1917.

The United States Civil Service Commission announces an open competitive examination for anatomist, for both men and women, on July 11, 1917. A vacancy in the Army Medical Museum, Office of the Surgeon General, Washington, D. C., at \$1,600 a year, and future vacancies requiring similar qualifications will be filled from this examination, unless it is found in the interest of the service to fill any vacancy by reinstatement, transfer, or promotion.

As an insufficient number of applications were filed for the examination of May 16, 1917, qualified persons are urged to apply.

As prerequisites for consideration for this position the appointee must have at least a collegiate degree, and have a thorough knowledge of the anatomy (and be experienced in the dissection) of disease-bearing mosquitoes of Southern United States, Panama, and the West Indies, and the Philippine Islands, and the relation of mosquitoes to the transmission of disease. A knowledge of pathology, bacteriology, and pathologic histology is also required, and the appointee must be capable of making photomicrographs, must understand microscopes, and be able to prepare, card, and keep in order museum specimens.

Applicants must have reached their twenty-first birthday on the date of the examination.

Applicants must be examined in the State or Territory in which they reside and have been actually domiciled in such State or Territory for at least one year previous to the examination, and must have the county officer's certificate in the application form executed.

Applicants must submit to the examiner on the day of the examination their photographs, taken within two years, securely pasted in the space provided on the admission cards sent them after their applications are filed. Tintypes or proofs will not be accepted.

This examination is open to all citizens of the United States who meet the requirements.

Applicants should at once apply for Form 1312, stating the title of the examination desired, to the Civil Service Commission, Washington, D. C. Applications should be properly executed, excluding the medical certificate, and filed with the Commission at Washington in time to arrange for the examination at the place selected by the applicant. The exact title of the examination, as given at the head of this announcement, should be stated in the application form.